

Flansberry, Menard & Associates

Flansberry, Ménard & Associés

TTAB

76 441 981

REGISTERED TRADE MARK AGENTS • AGENTS DE MARQUES LICENCIÉS

December 5, 2006

504 rue Kent Street
Ottawa, Ontario
CANADA
K2P 2B9

(613) 234-5280

Fax: (613) 236-4064

Web Site:/Site Web
www.trade-mark.ca

e-mail:/courriel:
rflansberry@
trade-mark.ca

kimberley@trade-mark.ca

UNITED STATES PATENT AND TRADEMARK OFFICE
Trademark Trial And Appeal Board
P.O. Box 1451
Alexandria, VA, U.S.A. 22313-1451

In re: Bose Corporation v. Goldwave Inc.
Trademark Trial And Appeal Board Proceeding No. 91165449

Dear Patent and Trademark Office,

Enclosed please find the original, signed deposition transcript and original exhibits for the deposition of Christopher Craig, taken November 17, 2006 in the above-referenced matter.

Yours truly,



Flansberry, Menard & Associates

c.c. Amy L. Brosius, Esq.
Fish & Richardson
225 Franklin Street, Suite 3200
Boston, MA, U.S.A. 02110

/c:/U.S. - Trademarks - Opposition - Interrogatories - Deposition - Transcript - Correspondence - USPTO -
TTAB - 06-12-05

12-15-2006

U.S. Patent & TMO/c/TM Mail Rcpt Dt. #22

Legal Counsel/Conseil légal: Robert G. Bales, BA.Sc. (Mech. Eng./Ing. Méc.), LL.B.

Consultants in Intellectual Property • Trade Marks • Licensing • Copyright • Patents • Corporations
Conseillers en Propriétés Intellectuelles • Marques de Commerce • Franchises • Droits d'Auteurs • Brevets • Corporations

**IN THE UNITED STATES PATENT AND
TRADEMARK OFFICE BEFORE THE
TRADEMARK TRIAL AND APPEAL BOARD**

IN THE MATTER of Application Serial No. 78/413775 for the Mark
GOLDWAVE published in the Official Gazette on April 12, 2005

BETWEEN:

BOSE CORPORATION

Opponent

- and -

GOLDWAVE INCORPORATED

Applicant

* * * * *

EXAMINATION OF CHRISTOPHER CRAIG
held at the offices of ASAP Reporting Services Inc.
Suite 1004 - 200 Elgin Street, Ottawa, Ontario
on Friday, November 17, 2006 at 10:00 a.m.

* * * * *

APPEARANCES:

Ms Amy L. Brosius

on behalf of the Opponent

Ms Mylene Dao
Mr. Raymond A. Flansberry

on behalf of the Applicant

A.S.A.P. Reporting Services Inc. © (2006)

**200 Elgin Street, Suite 1004
Ottawa, Ontario K2P 1L5
(613) 564-2727**

**130 King Street West, Suite 1800
Toronto, Ontario M5X 1E3
(416) 861-8720**

(ii)

INDEX

PAGE

SWORN: CHRISTOPHER CRAIG

1

Examination-in-chief by Ms Dao

1

* * * * *

LIST OF OBJECTIONS

OBJECTIONS found at pages:

3, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23,
24, 25, 27

* * * * *

(iii)

LIST OF EXHIBITS

NO.	DESCRIPTION	PAGE
A-1	Notice of Examination of Witness, dated November 6, 2006	1
A-2	Articles of Incorporation, GoldWave Incorporated, dated January 5, 2001	3
A-3	Printout from Sonic Spot web site	7
A-4	Printout from Wikipedia web site	8
A-5	Series of book references	11
A-6	Printout from Wave Systems Corporation	13
A-7	Printout from Waves Audio Limited web site	14
A-8	Printout from A-Wave Recording Studio web site	15
A-9	Printout from WebAIM web site	16
A-10	Printout from Wikipedia web site	16
A-11	Printout from KTWV "94.7 The Wave" web site	17
A-12	Printout from The Wave Media web site	18
A-13	Printout from GoldWave Incorporated	19
A-14	Printout from CNET Networks web site	20
A-15	Printout from Simtel web site	21
A-16	Printout from Simtel web site listing GoldWave product	21
A-17	Printout of Shareware River web site	22
A-18	Printout from PC Mechanic web site	23
A-19	Printout of Top Ten Reviews web site	24

Ottawa, Ontario

--- Upon commencing on Friday, November 17, 2006
at 10:00 a.m.

SWORN: CHRISTOPHER CRAIG

EXAMINATION-IN-CHIEF BY MS DAO:

1 Q. Good morning, Mr. Craig. You
have been sworn for this deposition.

8 A. I have, yes.

9 MS DAO: I would like to hand the
10 court reporter a document which we have marked as
11 Exhibit A-1, which is a copy of the Notice of
12 Examination of Witness. I am also providing a copy
13 to Ms Brosius.

14 EXHIBIT NO. A-1: Notice of
15 Examination of Witness, dated
16 November 6, 2006

17 MS DAO:

18 2 Q. Can you state your name and
19 residential address for the record?

20 A. My name is Christopher Craig.
21 I live at 174 Pine Line, Middle Cove, Newfoundland
22 and Labrador, Canada.

23 3 Q. Could you state for me your
24 educational and business background?

25 A. In 1994 I received a degree

CRAIG, in-ch (DAO)

1 in electrical engineering, a Bachelor of
2 Engineering specializing in electrical engineering.
3 In 1993 I started my own business developing
4 software. In 2001 I founded GoldWave Incorporated
5 and since then I have been pretty much running that
6 corporation, in all aspects of it.

7 4 Q. What is your business
8 involvement and relationship with GoldWave
9 Incorporated?

10 A. I am the director, the
11 president and the principal shareholder.

12 5 Q. Could you elaborate a little
13 bit about what your responsibilities are with
14 GoldWave Incorporated?

15 A. I just mentioned that I was
16 president, but I am also the product developer. I
17 develop all the software that the company sells. I
18 am also in charge of marketing and sales, and
19 generally leading the company.

20 6 Q. What is the date of
21 incorporation of GoldWave Incorporated?

22 A. It was incorporated on
23 January 5, 2001.

24 MS DAO: I would like to hand the
25 court reporter a document which we marked as

CRAIG, in-ch (DAO)

1 Exhibit A-2. This is a notarized copy of the
2 articles of incorporation of GoldWave Incorporated,
3 a Province of Newfoundland Corporation, Canada. I
4 am also providing Ms Brosius with a copy of same.

5 **MS BROSIUS:** I would like to
6 interpose an objection to any documents that are
7 submitted today to the extent they were requested
8 during discovery and not provided. That can be a
9 standing objection.

10 **--- OBJECTION**

11 **EXHIBIT NO. A-2:** Articles of
12 Incorporation, GoldWave
13 Incorporated, dated January
14 5, 2001

15 **MS DAO:**

16 7 **Q.** Mr. Craig, how long have you
17 been with GoldWave Incorporated?

18 **A.** Since I founded it in 2001.

19 8 **Q.** How long has GoldWave
20 Incorporated been in the audio editing software
21 business?

22 **A.** About six years now, almost
23 six years.

24 9 **Q.** Could you please explain who
25 used the mark GOLDWAVE or who was the predecessor

CRAIG, in-ch (DAO)

1 in title of the mark from 1993 to 2001, that is,
2 before the incorporation date of GoldWave
3 Incorporated?

4 A. I was the holder of the mark
5 during that time.

6 10 Q. Are you familiar with the
7 advertising functions of your GoldWave products?

8 A. Yes, I am.

9 11 Q. Could you please elaborate on
10 these functions for me?

11 A. That could include things
12 like posting announcements of releases on the web
13 site. It includes things like posting product
14 information on the corporate web site. It also
15 includes things like Google advertising and other
16 forms of internet advertising. But I don't
17 actually use television, radio or magazine ads.

18 12 Q. Do your responsibilities also
19 extend to sales information in your position?

20 A. Yes, it does.

21 13 Q. Are you familiar with all the
22 technical, administrative, marketing and sales
23 aspects of your products?

24 A. I am, yes.

25 14 Q. How long has the mark

CRAIG, in-ch (DAO)

1 GOLDWAVE been in use in the marketplace?

2 A. It was first used May 1,
3 1993.

4 15 Q. Can you tell me who first
5 advised you to file your corporation's trade-mark
6 application currently subject to this opposition?

7 A. When I founded the company,
8 the Canadian attorney that filed the application
9 recommended that I register the trade-mark for
10 additional protection, but that wasn't done at the
11 time and I ended up doing it myself in 2004 on
12 behalf of the company.

13 16 Q. Could you explain how you
14 came to select GOLDWAVE as the name of your trade-
15 mark?

16 A. In the mid-eighties or so,
17 IBM and Microsoft worked together to create a
18 standard for storing audio in files on a computer
19 and that standard became known as the RIFF wave
20 standard. Since that time, files containing audio
21 have been pretty much known as wave files, at least
22 on the PC side of things anyway.

23 Another thing, in addition to the
24 wave file, I wanted the name to represent quality,
25 I so chose -- gold often represents quality, so I

CRAIG, in-ch (DAO)

1 thought that putting the two words together, "gold"
2 and "wave", would be an ideal choice.

3 Another limiting factor was the
4 fact that file names back in that day had to be
5 eight characters or less, so it kind of limited
6 what names I could choose. That's essentially how
7 the name came about.

8 An advantage of that was actually
9 that the name turned out to be unique. I searched
10 on the internet and there were no other companies
11 using the word "goldwave" for their products, so
12 that's the reason I chose it.

13 17 Q. How would you describe your
14 GoldWave product?

15 A. The main GoldWave product I
16 would describe as a digital audio editor. It can
17 manipulate audio. It's similar to a word
18 processor, in some respects, where you can copy and
19 paste words around. With this program you can copy
20 and paste sections of audio around. You can add
21 special effects like echo and reverb and noise
22 reduction, similar things like that. But the
23 program can do much more than that. It can convert
24 audio, it can restore it, it can record it, analyse
25 it and do all the things that a typical audio

CRAIG, in-ch (DAO)

1 editor wouldn't be able to do.

2 18 Q. What are the functions of
3 your trade-mark GOLDWAVE? What does it do?

4 A. The trade-mark is the only
5 way that customers can find the product or find the
6 company or find information where to purchase the
7 product. It's pretty critical to this viable
8 company, I think. The only way that people know
9 the product is through advertising and word-
10 of-mouth.

11 19 Q. Who developed or created the
12 GoldWave product?

13 A. I created it and I continue
14 to develop it.

15 20 Q. How is the word "wave" used
16 in connection with your software?

17 A. It's used pretty much for
18 wave files, actually, because files containing
19 audio are typically known as wave files.

20 MS DAO: I would like to hand the
21 court reporter a document that we have marked as
22 Exhibit A-3. I am also providing a copy to Ms
23 Brosius.

24 EXHIBIT NO. A-3: Printout
25 from Sonic Spot web site

CRAIG, in-ch (DAO)

1 MS DAO:

2 21 Q. Mr. Craig, could you take a
3 look at Exhibit A-3 and tell me what that document
4 is?

5 A. This is a printout of "Wave
6 File Format" from the sonicspot.com web site. It
7 contains a lot of detailed information about the
8 internal structure of wave files.

9 The overview here states that the
10 wave file format is Windows' native file format for
11 storing digital audio data. It says that it has
12 become one of the most widely supported digital
13 audio file formats on the PC due to the popularity
14 of the Windows operating system and the huge number
15 of programs written for the platform. It says that
16 almost every modern program that can open and/or
17 save digital audio supports this file format,
18 making it extremely useful and a virtual
19 requirement for software developers to understand.

20 MS DAO: Thank you. I am handing
21 the court reporter a document which we have marked
22 as Exhibit A-4. I am also providing Ms Brosius
23 with a copy of same.

24 EXHIBIT NO. A-4: Printout
25 from Wikipedia web site

CRAIG, in-ch (DAO)

1 MS DAO:

2 22 Q. Mr. Craig, could you take a
3 look at this exhibit and tell me what that document
4 is?

5 A. This is a printout of the
6 Wikipedia article for wave files. It mentions that
7 the format was developed by IBM and Microsoft. It
8 mentions that it's also a popular format. It says
9 it continues to enjoy widespread use with a variety
10 of software applications. It gives a few general
11 details about the format, but nothing specific
12 really, nothing detailed.

13 23 Q. How many kinds of products
14 are associated with the trade-mark GOLDWAVE?

15 A. There is the GoldWave Digital
16 Audio Editor and there is the GoldWave Voice plug-
17 in.

18 24 Q. Where are your GoldWave
19 products sold?

20 A. They are sold pretty much
21 exclusively through the internet.

22 25 Q. You mean online?

23 A. Online, yes.

24 26 Q. Are the products associated
25 with the GOLDWAVE trade-mark available for sale in

CRAIG, in-ch (DAO)

1 computer stores, let's say, or department stores?

2 A. No, they are not.

3 27 Q. Are they sold by mail order?

4 A. Only directly through the
5 company. A customer would go to the web site,
6 print out the order form and send it directly to
7 the corporation.

8 28 Q. So web site again.

9 A. Yes, but still through the
10 mail.

11 29 Q. Are they available through
12 the shopping channels on television?

13 A. No, they are not.

14 30 Q. Have you ever showcased or
15 sold your GoldWave products at any trade shows?

16 A. No, I haven't.

17 31 Q. So I am correct to conclude
18 that your GoldWave software is available for sale
19 and purchase by customers online through the
20 internet only.

21 A. That's right, except for mail
22 order through the company.

23 32 Q. So it's not distributed
24 through computer stores, or stores like Wal-Mart,
25 shopping channels, trade shows and the like.

CRAIG, in-ch (DAO)

1 A. No, it's not.

2 33 Q. How are they distributed?

3 Can it be distributed through books, let's say?

4 A. Copies of the program have
5 been included with books, yes.

6 MS DAO: I would like to hand the
7 court reporter a document we have marked as Exhibit
8 A-5. I am also providing Ms Brosius with a copy of
9 same.

10 EXHIBIT NO. A-5: Series of
11 book references

12 MS DAO:

13 34 Q. Mr. Craig, can you tell me
14 what these documents are?

15 A. These are samples of books
16 that have included the GoldWave software.

17 MS BROSIUS: I am going to object
18 on the basis that these were not provided during
19 discovery.

20 --- OBJECTION

21 THE WITNESS: Actually, I think
22 some of them were.

23 MS BROSIUS: I will modify that
24 and say to the extent they were not.

25 THE WITNESS: All right.

CRAIG, in-ch (DAO)

1 MS DAO:

2 35 Q. Does GoldWave Incorporated
3 make use of distributors or middlemen or big ticket
4 sales stores to distribute its products?

5 A. No, it doesn't.

6 36 Q. I am going to let you explain
7 Exhibit A-5.

8 A. The first book reference here
9 is *Home Page Improvement*. It was copyrighted in
10 1997. It includes a brief description of GoldWave
11 Audio Editor. It's currently under my name in this
12 one, but this was before the company was
13 incorporated.

14 The next one is *Carrara 1 for*
15 *Dummies*. The GoldWave program was also included
16 with this book. The copyright of this book is
17 2000. It is also mentioned under my name before
18 the company was incorporated.

19 The next one is *VoiceXML*. I
20 received a letter from the marketing manager of
21 this book which is included here. It includes just
22 a few lines about my product. It's one sentence or
23 so. The copyright of this book was 2002.

24 The next one is *Java for Dummies*.
25 This one was copyrighted in 1998. It contains a

CRAIG, in-ch (DAO)

1 few paragraphs about my program, mentioning that it
2 converts files and includes sound effects. It also
3 mentions how the software can be used for creating
4 audio files for web sites.

5 The next one is *Sound Blaster: The*
6 *Official Book*, Second Edition. This one is
7 copyrighted 1994. It includes several pages about
8 the GoldWave product. It gives my name as the
9 developer. There is a typo there, but it's still
10 my information.

11 37 Q. Thank you, Mr. Craig. Are
12 you aware of any other use of the word "wave"?

13 A. The word "wave" is used in a
14 lot of different ways. Here in Canada there is the
15 Pontiac Wave, which is a car. There is a wave that
16 you do when you greet somebody. There is the
17 scientific wave which is transition waves or radio
18 waves. There are so many different ways for "wave"
19 to be used, lots of examples, really.

20 MS DAO: I would like to hand the
21 court reporter a document that we have marked as
22 Exhibit A-6. I am handing a copy of same to Ms
23 Brosius.

24 EXHIBIT NO. A-6: Printout
25 from Wave Systems Corporation

CRAIG, in-ch (DAO)

1 web site

2 MS DAO:

3 38 Q. Mr. Craig, can you take a
4 look at this and tell me what that document is?

5 A. This is a printout of
6 wave.com web site. They are owned by Wave Systems
7 Corporation. I guess this is an example of how the
8 word "wave" could be used with computers. In this
9 case, it's trusted computing.

10 MS BROSIUS: I am going to object
11 based on foundation and also relevance.

12 --- OBJECTION

13 MS DAO: I would like to hand the
14 court reporter a document which we have marked as
15 Exhibit A-7. I am going to hand Ms Brosius a copy
16 of same.

17 EXHIBIT NO. A-7: Printout
18 from Waves Audio Limited web
19 site

20 MS DAO:

21 39 Q. Mr. Craig, can you take a
22 look at it and tell me what this document is?

23 A. This is a printout of
24 waves.com web site. I think it's owned by Waves
25 Audio Limited. They create audio software similar

CRAIG, in-ch (DAO)

1 to the kind of software I create. This is another
2 example of a computer company using the word
3 "waves" or "wave" for their products.

4 MS BROSIUS: I am going to object
5 based on relevance and foundation.

6 --- OBJECTION

7 MS DAO: I would like to hand the
8 court reporter a document that we have marked as
9 Exhibit A-8. I am going to hand to Ms Brosius a
10 copy of same.

11 EXHIBIT NO. A-8: Printout
12 from A-Wave Recording Studio
13 web site

14 MS DAO:

15 40 Q. Mr. Craig, can you take a
16 look at it and tell me what that document is?

17 A. This is a printout of A-Wave
18 Studio's web site. They are a recording studio.
19 The image here shows recording equipment and
20 speaker systems. It's another example of the word
21 "wave" being used.

22 MS BROSIUS: I am going to object
23 based on relevancy.

24 --- OBJECTION

25 MS DAO: I would like to hand the

CRAIG, in-ch (DAO)

1 court reporter a document which we have marked as
2 Exhibit A-9. I am going to hand Ms Brosius a copy
3 of same.

4 **EXHIBIT NO. A-9:** Printout
5 from WebAIM web site

6 **MS DAO:**

7 **41** **Q.** Mr. Craig, can you please
8 also take a look at this document and tell me what
9 it is?

10 **A.** This is a printout of a tool
11 web site that promotes a tool for accessibility, I
12 think, for visually impaired people. In this case,
13 the word "wave" is used as an acronym for web
14 accessibility versatile evaluator.

15 **MS BROSIUS:** I object based on
16 relevancy and foundation.

17 **--- OBJECTION**

18 **MS DAO:** I would like to hand the
19 court reporter a document we have marked as Exhibit
20 A-10. I am handing Ms Brosius a copy of same.

21 **EXHIBIT NO. A-10:** Printout
22 from Wikipedia web site

23 **MS DAO:**

24 **42** **Q.** Mr. Craig, could you please
25 look at this document and identify it and provide

CRAIG, in-ch (DAO)

1 me with your comments?

2 A. This is the Wikipedia article
3 for the word "wave" itself. It gives more of a
4 scientific definition of the word "wave". It gives
5 a mathematical description.

6 There is a little note at the top
7 of the page mentioning that the article should
8 probably be split into different articles because
9 of the ambiguity with the word "wave" and its many
10 different uses.

11 There are some examples of waves
12 given on the next page, page 2, such as ocean
13 surface waves, radio waves, microwaves, sound
14 waves, seismic waves, gravitational waves. There
15 are a lot of different uses of the word "wave"
16 there as well.

17 MS BROSIUS: I object based on
18 relevancy.

19 --- OBJECTION

20 MS DAO: I would like to hand the
21 court reporter a document which we have marked as
22 Exhibit A-11. I hand a copy of same to Ms Brosius.

23 EXHIBIT NO. A-11: Printout
24 from KTWV "94.7 The Wave" web
25 site

CRAIG, in-ch (DAO)

1 MS DAO:

2 43 Q. Again, Mr. Craig, could you
3 take a look at the document and tell me what that
4 is?

5 A. This is a printout of the web
6 site for KTWV, a Los Angeles radio station. They
7 call themselves "94.7 The Wave". There is quite an
8 extensive use of the word "wave" on this web site.

9 MS BROSIUS: I object based on
10 relevancy.

11 --- OBJECTION

12 MS DAO: I would like to hand the
13 court reporter a document which we have marked as
14 Exhibit A-12. I am going to hand Ms Brosius a copy
15 of same.

16 EXHIBIT NO. A-12: Printout
17 from The Wave Media web site

18 MS DAO:

19 44 Q. Mr. Craig, could you take a
20 look at the document, identify it and provide me
21 with your comments?

22 A. This is a printout of The
23 Wave Media web site. They have an entertainment
24 magazine called *The Wave*. This is another example
25 of the word "wave" being used on the internet.

CRAIG, in-ch (DAO)

1 MS BROSIUS: I object. Relevancy.

2 --- OBJECTION

3 MS DAO: I would like to hand the
4 court reporter a document which we have marked as
5 Exhibit A-13. I hand a copy of same to Ms Brosius.

6 EXHIBIT NO. A-13: Printout
7 from GoldWave Incorporated
8 web site

9 MS DAO:

10 45 Q. Can you take a look at this
11 document, Mr. Craig, identify it and give me your
12 comments, if any?

13 A. This is the corporation's
14 main web site. It includes a lot of information
15 about the products that the corporation sells. It
16 contains news items, product releases, how the
17 product has been mentioned in the news on the BBC
18 and the *Houston Chronicle*. It provides a bunch of
19 links for product purchasing or to download the
20 trial version or customer support. It mentions
21 that the product has been in use for over 10 years
22 with widespread usage. It mentions that the
23 product supports the wave file format.

24 At the bottom of the page it also
25 indicates that the site has been accessed over 13

CRAIG, in-ch (DAO)

1 million times since 1998.

2 MS DAO: Thank you. I am handing
3 the court reporter a document which we have marked
4 as Exhibit A-14. I hand a copy of same to Ms
5 Brosius.

6 EXHIBIT NO. A-14: Printout
7 from CNET Networks web site

8 MS DAO:

9 46 Q. Could you take a look at it,
10 Mr. Craig, and tell me what that document is?

11 A. This is a printout of
12 GoldWave's listing on download.com, which is a very
13 popular download web site. It provides a
14 description of the GoldWave product. It shows an
15 average user rating of four-and-a-half out of five
16 stars. It shows that the product has been
17 downloaded close to one million times now. It
18 mentions that the product is a popular download.
19 It mentions some of the features that were added to
20 a recent update to the program.

21 MS BROSIUS: I want to object
22 based on this exhibit not being produced in
23 discovery.

24 --- OBJECTION

25 MS DAO: I would like to hand the

CRAIG, in-ch (DAO)

1 court reporter a document which we have marked as
2 Exhibit A-15. I am also handing Ms Brosius a copy
3 of same.

4 **EXHIBIT NO. A-15: Printout**
5 from Simtel web site

6 **MS DAO:**

7 **47 Q.** Mr. Craig, can you also take
8 a look at this document, identify it and provide me
9 with your comments?

10 **A.** This is a printout of the
11 Simtel web site, the main page that people see when
12 they go to the site. It lists the top 10 most
13 popular downloads on the site and the GoldWave
14 product is listed as No. 9. It shows that the
15 product has been downloaded 3,000 times in the past
16 week.

17 **MS BROSIUS:** I am going to object
18 on the basis that this was not a document produced
19 during discovery.

20 **--- OBJECTION**

21 **MS DAO:** I would like to hand the
22 court reporter a document which we have marked as
23 Exhibit A-16. I would also like to hand Ms Brosius
24 a copy of same.

25 **EXHIBIT NO. A-16: Printout**

CRAIG, in-ch (DAO)

1 from Simtel web site listing
2 GoldWave product

3 MS DAO:

4 48 Q. Mr. Craig, could you take a
5 look at this document, identify it and give me your
6 comments, if any?

7 A. This is the listing of
8 GoldWave product itself on the Simtel web site. It
9 gives some information about the product, provides
10 download links. It mentions that the product
11 supports wave files.

12 On page 2 there is a couple of
13 very favourable reviews of the product as well.

14 MS BROSIUS: I would like to
15 object on the basis that this was not a document
16 produced during discovery.

17 --- OBJECTION

18 MS DAO: I would like to hand the
19 court reporter a document which we have marked as
20 Exhibit A-17. I am handing a copy of same to Ms
21 Brosius.

22 EXHIBIT NO. A-17: Printout
23 of Shareware River web site

24 MS DAO:

25 49 Q. Mr. Craig, can you take a

CRAIG, in-ch (DAO)

1 look at the document and tell me what that is?

2 **A.** This is a listing of the
3 GoldWave product on the Shareware River web site.
4 It gives a brief description of the product. It
5 shows a five out of five star rating. It mentions
6 that the product has been downloaded 3,500 times.

7 **MS BROSIUS:** I renew my prior
8 objection with respect to this exhibit.

9 **--- OBJECTION**

10 **MS DAO:** I would like to hand the
11 court reporter a document which we have marked as
12 Exhibit A-18. I am also providing Ms Brosius with
13 same.

14 **EXHIBIT NO. A-18:** Printout
15 from PC Mechanic web site

16 **MS DAO:**

17 **50 Q.** Mr. Craig, can you take a
18 look at it and tell me what that is?

19 **A.** This is a review of the
20 GoldWave product on the PC Mechanic web site. It
21 gives a very favourable description of the program.
22 It provides some details about the general tools
23 that are available in the program and some of the
24 more advanced tools.

25 **MS BROSIUS:** I would like to

CRAIG, in-ch (DAO)

1 interpose an objection with respect to this
2 exhibit.

3 --- OBJECTION

4 MS DAO: I would like to hand the
5 court reporter a document which we have marked as
6 Exhibit A-19. I am handing Ms Brosius a copy of
7 same.

8 EXHIBIT NO. A-19: Printout
9 of Top Ten Reviews web site

10 MS DAO:

11 51 Q. Mr. Craig, can you take a
12 look and tell me what this document is?

13 A. This is a very recent review
14 of GoldWave on toptenreviews.com web site. It
15 gives a rating of the program of three-and-a-half
16 out of four overall. It shows that the product
17 received a silver award. It gives a very
18 favourable review of the product as well. It
19 mentions some of the functionality of the program.
20 It mentions that help and support provided for the
21 product is excellent.

22 I notice on the left-hand side
23 there is a listing of other audio programs and
24 several of them also use the word "wave" in their
25 names.

CRAIG, in-ch (DAO)

1 MS BROSIUS: I am going to object
2 based on the fact that this was not produced during
3 discovery and also relevance.

4 --- OBJECTION

5 THE WITNESS: It's pretty recent,
6 actually.

7 MS DAO: Thank you.

8 52 Q. What is the latest version of
9 the GoldWave software?

10 A. The latest version is 5.17.

11 53 Q. What changes were made?

12 A. The latest version was more
13 of a maintenance update to correct some issues with
14 version 5.15 and to improve features from previous
15 versions.

16 54 Q. What happens after a customer
17 purchases the GoldWave software?

18 A. When they purchase on the web
19 site, they will receive an activation code through
20 e-mail. The customer then downloads the product
21 from the web site and they enter the activation
22 code into the program for full use.

23 55 Q. How is support provided to
24 your customers?

25 A. Primarily through the web

CRAIG, in-ch (DAO)

1 site. Customers can go to the web site and post a
2 question on the forum which would probably be
3 answered by me or other GoldWave users. They can
4 used the "frequently asked questions" information
5 that is provided on the web site. There is also a
6 troubleshooter built into the web site where they
7 can navigate links and find solutions to problems
8 that they might have. Or they can just e-mail me
9 directly.

10 56 Q. What is the cost per unit in
11 U.S. dollars of your GoldWave software?

12 A. Each licence costs \$45 U.S.

13 MS DAO: I would like to make this
14 next question for the deposition confidential.

15 --- See confidential transcript for Question No. 57

16 MS DAO:

17 58 Q. Does your corporation sell
18 speakers, radios or CD systems?

19 A. No, it doesn't.

20 59 Q. Have you ever been contacted
21 by anyone searching for Bose Corporation's
22 products?

23 A. No, I haven't.

24 MS DAO: Thank you. That's all I
25 have for direct examination.

CRAIG, in-ch (DAO)

1 Do you want to take a short break?

2 MS BROSIUS: No. Actually, I

3 don't have any cross.

4 I just want to again state our
5 same objection with respect to any documents
6 submitted here today that were requested but not
7 produced during discovery.

8 --- OBJECTION

9 THE WITNESS: Some of the
10 documents are actually new that we didn't have at
11 the time. The Top Ten Reviews is a new one.

12 --- Whereupon the examination concluded
13 at 10:30 a.m.

I HEREBY CERTIFY THAT I have, to the best
of my skills and abilities, accurately recorded
by Stenomask and transcribed therefrom, the
foregoing proceeding.

A handwritten signature in cursive script, appearing to read "S. Hubbard".

Suzanne Hubbard, Stenomask Reporter

**IN THE UNITED STATES PATENT AND
TRADEMARK OFFICE BEFORE THE
TRADEMARK TRIAL AND APPEAL BOARD**

IN THE MATTER of Application Serial No. 78/413775 for the Mark
GOLDWAVE published in the Official Gazette on April 12, 2005

BETWEEN:

BOSE CORPORATION

Opponent

- and -

GOLDWAVE INCORPORATED

Applicant

* * * * *

EXAMINATION OF CHRISTOPHER CRAIG
held at the offices of ASAP Reporting Services Inc.
Suite 1004 - 200 Elgin Street, Ottawa, Ontario
on Friday, November 17, 2006 at 10:00 a.m.

* * * * *

**CONFIDENTIAL
EXCERPT TRANSCRIPT**

APPEARANCES:

Ms Amy L. Brosius

on behalf of the Opponent

Ms Mylene Dao
Mr. Raymond A. Flansberry

on behalf of the Applicant

A.S.A.P. Reporting Services Inc. © (2006)

**200 Elgin Street, Suite 1004
Ottawa, Ontario K2P 1L5
(613) 564-2727**

**130 King Street West, Suite 1800
Toronto, Ontario M5X 1E3
(416) 861-8720**

CONFIDENTIAL

CRAIG, in-ch (Dao)

Ottawa, Ontario

1
2 --- Upon commencing the excerpt transcript on
3 Friday, November 17 2006.

MS DAO:

4
5 57 Q. How often is your GoldWave
6 product downloaded from the internet?

7 A. It's almost impossible to get
8 the exact download numbers because the program is
9 provided on a number of different download sites.
10 Some of them were mentioned in the exhibits.

11 Just taking numbers from the main
12 GoldWave primary download server, software on
13 average is downloaded approximately 100,000 times
14 per month. This month, however, is a bit different
15 because an update was released and so far we have
16 already had 100,000 downloads. I would expect
17 maybe 200,000 downloads this month.

18 --- Whereupon the excerpt transcript concluded.

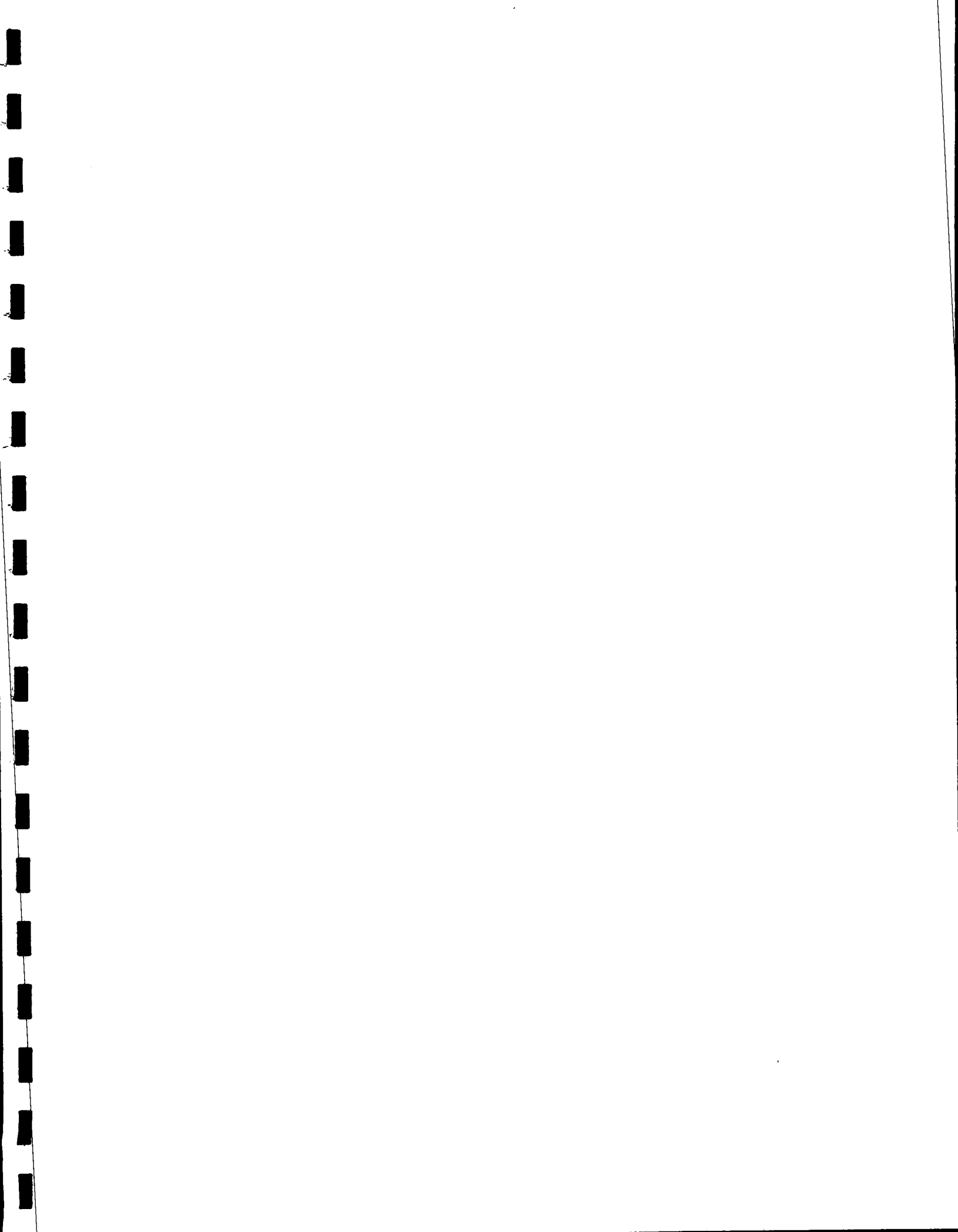


Exhibit "A-1"
Notice of Examination of Witness

EXHIBIT NO. A-1
EXAM OF CHRISTOPHER CRAIG
DATE NOV. 17/66
REPORTER SH
ACAP Reporting Services Inc.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD**

In the matter of Application Serial No. 78/413775
For the Mark GOLDWAVE
Published in the Official Gazette on April 12, 2005

Bose Corporation,

Opposer,

v.

GoldWave Incorporated,

Applicant,

Opposition No. 91165449

NOTICE OF EXAMINATION OF WITNESS

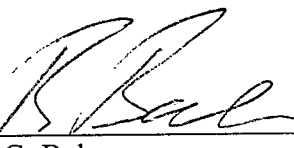
PLEASE TAKE NOTICE that commencing at 10:00 A.M. on November 17, 2006, pursuant to 37 C.F.R. § 2.123(2), Applicant, GoldWave Incorporated ("Applicant"), will take testimonial deposition upon oral examination of the following witness before an officer authorized to administer oaths and recorded by stenographic means, for use in the above-identified matter:

Mr. Christopher Craig
President, Goldwave Incorporated
174 Pine Line
Middle Cove, Newfoundland & Labrador, Canada
A1C 5H5

The deposition will take place at 200 Elgin Street, Suite 1004, Ottawa, Ontario, K2P 1L5, Canada, and will continue from day to day until completed.

You are invited to attend and cross-examine.

Date: NOVEMBER 6, 2006


Robert G. Bales
Mylene Dao
FLANSBERRY, MENARD & ASSOCIATES
504 Kent Street
Ottawa, Ontario K2P 2B9
Telephone: (613) 234-5280
Facsimile: (613) 236-4064

Attorneys for Applicant
FLANSBERRY, MENARD & ASSOCIATES

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing NOTICE OF EXAMINATION OF WITNESS has this 6th day of November 2006, been mailed by prepaid first class mail to the below-identified Attorney at his/her place of business

Ms. Amy L. Brosius
FISH & RICHARDSON P.C.
225 Franklin Street
Boston, MA 02110
U.S.A.



Michelle Flansberry Duquette

Exhibit "A-2"

Notarized Articles of Incorporation of Goldwave Incorporated,
a Province of Newfoundland Corporation (Canada)

EXHIBIT NO. A-2
EXAM OF CHALSTON CRAIG
DATE NOV. 17 / 06
REPORTER S. H.
ASAP Reporting Services Inc.



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR
Department of Government Services and Lands

THE CORPORATIONS ACT
FORM 2

CERTIFICATE OF INCORPORATION
(Section 15)

GoldWave, Inc.

44263

Name of Corporation

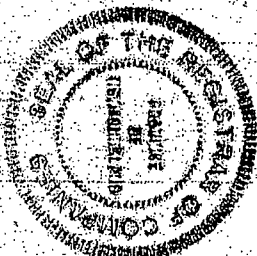
Number

I certify that the Corporation, the Articles of Incorporation of which are attached, was
incorporated under the *Corporations Act*.

Sonaine Ukey

Registrar

Date of Incorporation
January 5, 2001



I HEREBY CERTIFY that this is a true copy of
a document filed in the Registry of Companies for the
Province of Newfoundland on the

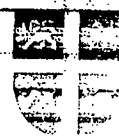
5th day of January A.D., 2001

in file # 44263

John Neary
John F. Neary (Notary Public, Newfoundland)

Dated at St. John's, Newfoundland this

14th day of November A.D. 2006



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

THE CORPORATIONS ACT

FORM 1

REGISTRY OF COMPANIES

Reg. No. 44263

Filed Jan 5 2001

Paper No. 002234

Fee Paid \$250. Rec. No. 8017569

ARTICLES OF INCORPORATION

(Sections 12, 421, 463, 490)

Registrar of Companies (Nfld.)

1 - Name of Corporation

GoldWave, Inc.

2 - The place in Newfoundland where the registered office is to be situated

15 Waterloo Crescent
Mount Pearl, NF A1N 3X4

3 - The classes and maximum number of shares that the corporation is authorized to issue

100 no par value common shares

4 - Restrictions if any on share transfers

nil

5 - Number (or minimum and maximum number) of directors

minimum 1 maximum 7

6 - Restrictions if any on business the corporation may carry on

nil

7 - Other provisions if any

8 - Incorporators

Names	Address (Include Postal Code)	Signature
Marilyn A. Pendergast	Suite 201, 155 Water St. St. John's, NF A1C 1B3	<i>Marilyn Pendergast</i>

RECEIVED

JAN 05 2001

For Department use only

Corporation No. -

REGISTRY OF COMPANIES

I HEREBY CERTIFY that this is a true copy of
a document filed in the Registry of Companies for the
Province of Newfoundland on the

5th day of January A.D., 2001

in file # 44203

John F. Neary
John F. Neary (Notary Public, Newfoundland)

Dated at St. John's, Newfoundland this

14th day of November A.D., 2006

Exhibit "A-3"

Internet site for Sonic Spot

EXHIBIT NO. A-3
EXAM OF CHRISTOPHER CRAIG
DATE NOV. 17/06
REPORTER S. H.
ASAP Reporting Services Inc.

[Software](#)[Hardware](#)[Guides](#)[Resources](#)[Forums](#)[Search](#)[News](#)**We buy Fujitsu FLM gear**

We purchase any type of new or used Central Office and Data equipment
SectorSupply.com

Test Case Management

Manage test cases, defects, requirements with Software Planner.
www.SoftwarePlanner.com

[Ads by Google](#)[Advertise on this site](#)

Home : [Guides](#) : [File Formats](#) : [Specifications](#) : [Wave File Format](#)

"Wave File Format"

Table of Contents

- [Overview](#)
- [Data Formats](#)
- [File Structure](#)
 - [Wave File Header](#)
 - [Wave File Chunks](#)
 - [Format Chunk - "fmt "](#)
 - [Data Chunk - "data"](#)
 - [Fact Chunk - "fact"](#)
 - [Cue Chunk - "cue "](#)
 - [Playlist Chunk - "plst"](#)
 - [Associated Data List Chunk - "list"](#)
 - [Label Chunk - "labl"](#)
 - [Labeled Text Chunk - "ltxt"](#)
 - [Note Chunk - "note"](#)
 - [Sample Chunk - "smpl"](#)
 - [Instrument Chunk - "inst"](#)
- [Format Variations](#)

Overview

The Wave file format is Windows' native file format for storing digital audio data. It has become one of the most widely supported digital audio file formats on the PC due to the popularity of Windows and the huge number of programs written for the platform. Almost every modern program that can open and/or save digital audio supports this file format, making it both extremely useful and a virtual requirement for software developers to understand. The following specification gives a detailed description of the structure and inner workings of this format.

Data Formats

Since the Wave file format is native to Windows and therefor Intel processors, all data values are stored in Little-Endian (least significant byte first) order.

Strings

Wave files may contain strings of text for specifying cue point labels, notes, etc. Strings are stored in a format where the first byte specifies the number of following ASCII text bytes in the string. The following bytes are of course the ASCII character bytes that make up the text string. Pascal programmers will notice that this is the same format used for Pascal strings.

7 'e' 'x' 'a' 'm' 'p' 'l' 'e'

Wave String Format Example

File Structure

Wave files use the standard RIFF structure which groups the files contents (sample format, digital audio samples, etc.) into separate chunks, each containing it's own header and data bytes. The chunk header specifies the type and size of the chunk data bytes. This organization method allows programs that do not use or recognize particular types of chunks to easily skip over them and continue processing following known chunks. Certain types of chunks may contain sub-chunks. For example, in the diagram to the right, you can see that the "fmt " and "data" chunks are actually sub-chunks of the "RIFF" chunk.

One tricky thing about RIFF file chunks is that they must be word aligned. This means that their total size must be a multiple of 2 bytes (ie. 2, 4, 6, 8, and so on). If a chunk contains an odd number of data bytes, causing it not to be word aligned, an extra padding byte with a value of zero must follow the last

Basic Wave File Layout

Chunk ID "RIFF"
Chunk Data Size

RIFF Type ID "WAVE"

Chunk ID "fmt "

data byte. This extra padding byte is not counted in the chunk size, therefore a program must always word align a chunk headers size value in order to calculate the offset of the following chunk.

Wave File Header - RIFF Type Chunk

Wave file headers follow the standard RIFF file format structure. The first 8 bytes in the file is a standard RIFF chunk header which has a chunk ID of "RIFF" and a chunk size equal to the file size minus the 8 bytes used by the header. The first 4 data bytes in the "RIFF" chunk determines the type of resource found in the RIFF chunk. Wave files always use "WAVE". After the RIFF type comes all of the Wave file chunks that define the audio waveform.

Offset	Size	Description	Value
0x00	4	Chunk ID	"RIFF" (0x52494646)
0x04	4	Chunk Data Size	(file size) - 8
0x08	4	RIFF Type	"WAVE" (0x57415645)
0x10		Wave chunks	

RIFF Type Chunk Values

Chunk Data Size
Sample Format Info
Chunk ID "data"
Chunk Data Size
Digital Audio Samples

Chunk Header
Chunk Data Bytes

Wave File Chunks

There are quite a few types of chunks defined for Wave files. Many Wave files contain only two of them, specifically the Format Chunk and the Data Chunk. These are the two chunks needed to describe the format of the digital audio samples and the samples themselves. Although it is not required by the official Wave file specification, it is good practice to place the Format Chunk before the Data Chunk. Many programs expect the chunks to be stored in this order and it is more sensible when streaming digital audio from a slow, linear source such as the Internet. If the format were to come after the data, all of the data and then the format would have to be streamed before playback could start correctly.

All RIFF Chunks and therefore Wave Chunks are stored in the following format. Notice that even the above mentioned RIFF Type Chunk conforms to this format.

Offset	Size	Description
0x00	4	Chunk ID
0x04	4	Chunk Data Size
0x08		Chunk Data Bytes

RIFF Chunk Format

The rest of this document goes through the different types of Wave chunks, describing the format of their data bytes and what they mean. You can use the table of contents at the beginning of this document to help find the chunk type you are interested in.

Format Chunk - "fmt "

The format chunk contains information about how the waveform data is stored and should be played back including the type of compression used, number of channels, sample rate, bits per sample and other attributes.

Offset	Size	Description	Value
0x00	4	Chunk ID	"fmt " (0x666D7420)
0x04	4	Chunk Data Size	16 + extra format bytes
0x08	2	Compression code	1 - 65,535
0x0a	2	Number of channels	1 - 65,535
0x0c	4	Sample rate	1 - 0xFFFFFFFF
0x10	4	Average bytes per second	1 - 0xFFFFFFFF
0x14	2	Block align	1 - 65,535
0x16	2	Significant bits per sample	2 - 65,535
0x18	2	Extra format bytes	0 - 65,535
0x1a		Extra format bytes *	

Wave Format Chunk Values, * read following text for details

Chunk ID and Data Size

The chunk ID is always "fmt " (0x666D7420) and the size is the size of the standard wave format data (16 bytes) plus the size of any extra format bytes needed for the specific Wave format, if it does not contain uncompressed PCM data. Note the chunk ID string ends with the space character (0x20).

Compression Code

The first word of format data specifies the type of compression used on the Wave data included in the Wave chunk found in this "RIFF" chunk. The following is a list of the common compression codes used today.

Code	Description
0 (0x0000)	Unknown
1 (0x0001)	PCM/uncompressed
2 (0x0002)	Microsoft ADPCM
6 (0x0006)	ITU G.711 a-law
7 (0x0007)	ITU G.711 ?-law
17 (0x0011)	IMA ADPCM
20 (0x0016)	ITU G.723 ADPCM (Yamaha)
49 (0x0031)	GSM 6.10
64 (0x0040)	ITU G.721 ADPCM
80 (0x0050)	MPEG
65,536 (0xFFFF)	Experimental

Common Wave Compression Codes

Number of Channels

The number of channels specifies how many separate audio signals that are encoded in the wave data chunk. A value of 1 means a mono signal, a value of 2 means a stereo signal, etc.

Sample Rate

The number of sample slices per second. This value is unaffected by the number of channels.

Average Bytes Per Second

This value indicates how many bytes of wave data must be streamed to a D/A converter per second in order to play the wave file. This information is useful when determining if data can be streamed from the source fast enough to keep up with playback. This value can be easily calculated with the formula:

$$\text{AvgBytesPerSec} = \text{SampleRate} * \text{BlockAlign}$$

Block Align

The number of bytes per sample slice. This value is not affected by the number of channels and can be calculated with the formula:

$$\text{BlockAlign} = \text{SignificantBitsPerSample} / 8 * \text{NumChannels}$$

Significant Bits Per Sample

This value specifies the number of bits used to define each sample. This value is usually 8, 16, 24 or 32. If the number of bits is not byte aligned (a multiple of 8) then the number of bytes used per sample is rounded up to the nearest byte size and the unused bytes are set to 0 and ignored.

Extra Format Bytes

This value specifies how many additional format bytes follow. It does not exist if the compression code is 0 (uncompressed PCM file) but may exist and have any value for other compression types depending on what compression information is need to decode the wave data. If this value is not word aligned (a multiple of 2), padding should be added to the end of this data to word align it, but the value should remain non-aligned.

Data Chunk - "data"

The Wave Data Chunk contains the digital audio sample data which can be decoded using the format and compression method specified in the Wave Format Chunk. If the Compression Code is 1 (uncompressed PCM), then the Wave Data contains raw sample values. This document explains how an uncompressed PCM data is stored, but will not get into the many supported compression formats.

Wave files usually contain only one data chunk, but they may contain more than one if they are contained within a Wave List Chunk ("wavl").

Offset	Length	Type	Description	Value
0x00	4	char[4]	chunk ID	"data" (0x64617461)
0x04	4	dword	chunk size	depends on sample length and compression
0x08			sample data	

Data Chunk Format

Multi-channel digital audio samples are stored as interlaced wave data which simply means that the audio samples of a multi-channel (such as stereo and surround) wave file are stored by cycling through the audio samples for each channel before advancing to the next

sample time. This is done so that the audio files can be played or streamed before the entire file can be read. This is handy when playing a large file from disk (that may not completely fit into memory) or streaming a file over the Internet. The values in the diagram below would be stored in a Wave file in the order they are listed in the Value column (top to bottom).

Time	Channel	Value
0	1 (left)	0x0053
	2 (right)	0x0024
1	1 (left)	0x0057
	2 (right)	0x0029
2	1 (left)	0x0063
	2 (right)	0x003C

Interlaced Stereo Wave Samples

One point about sample data that may cause some confusion is that when samples are represented with 8-bits, they are specified as unsigned values. All other sample bit-sizes are specified as signed values. For example a 16-bit sample can range from -32,768 to +32,767 with a mid-point (silence) at 0.

As mentioned earlier, all RIFF chunks (including WAVE "data" chunks) must be word aligned. If the sample data uses an odd number of bytes, a padding byte with a value of zero must be placed at the end of the sample data. The "data" chunk header's size should not include this byte.

Fact Chunk - "fact"

A fact chunk stores compression code dependant information about the contents of the Wave file. It is required by all compressed WAVE formats and if the waveform data is contained inside a "wavl" LIST chunk, but is not required for the uncompressed PCM WAVE format files (compression code 1) that contain the waveform data inside a "data" chunk.

Offset	Size	Description	Value
0x00	4	Chunk ID	"fact" (0x66616374)
0x04	4	Chunk Data Size	depends on format
0x08		Format Dependant Data	
		Fact Chunk Format	

Format Dependant Data

There is currently only one field defined for the format dependant data. It is a single 4-byte value that specifies the number of samples in the waveform data chunk. This value can be used with the Samples Per Second value specified in the format chunk to calculate the waveforms length in seconds.

As new WAVE formats are introduced, the fact chunk will be expanded, appending fields after the defined number of samples field. Applications can use the fact chunk size to determine which fields are present in the chunk.

Wave List Chunk - "wavl"

A wave list chunk is used to specify several alternating "sInt" and "data" chunks. These chunks can help reduce a Wave file's size while specifying audible segments of samples when a stream of digital audio contains several periods of silence.

This type of chunk is considered to be an abuse of the Wave file format by many programmers (including myself) and it's support is not recommended. Also many programs will not recognize this type of chunk, simply ignoring it. This form of compression unnecessarily complicates the structure of a Wave file and could be better implemented in other ways, including the use of several existing compression formats.

Offset	Size	Description	Value
0x00	4	Chunk ID	"sInt" (0x736C6E74)
0x04	4	Chunk Data Size	depends on size of data and sInt chunks
0x08		List of Alternating "sInt" and "data" Chunks	
		Wave List Chunk Format	

Silent Chunk - "sInt"

A silent chunk is used to specify a segment of silence that will last some duration of samples. It is always contained within a wave list chunk. While this chunk represents silence, it does not necessarily define a zero volume or baseline sample. It actually holds the last sample value present in the preceding data chunk in the wave list chunk. If there is no preceding data chunk in the wave list chunk, a baseline value should be used (127 for 8-bit data, 0 for 16-bit or higher data). This may seem trivial, but if not followed, may cause undesired clicks and pops in the audio signal.

Offset	Size	Description	Value
--------	------	-------------	-------

0x00	4	Chunk ID	"sInt" (0x736C6E74)
0x04	4	Chunk Data Size	4
0x08	4	Number of Silent Samples	0 - 0xFFFFFFFF

Silent Chunk Format

Number of Silent Samples

This value specifies the number of silent samples that appear in the waveform at this point in the wave list chunk.

Cue Chunk - "cue "

A cue chunk specifies one or more sample offsets which are often used to mark noteworthy sections of audio. For example, the beginning and end of a verse in a song may have cue points to make them easier to find. The cue chunk is optional and if included, a single cue chunk should specify all cue points for the "WAVE" chunk. No more than one cue chunk is allowed in a "WAVE" chunk.

Offset	Size	Description	Value
0x00	4	Chunk ID	"cue " (0x63756520)
0x04	4	Chunk Data Size	depends on Num Cue Points
0x08	4	Num Cue Points	number of cue points in list
0x0c		List of Cue Points	

Cue Chunk Format

Chunk ID and Data Size

The chunk ID for a cue chunk is always "cue " (0x666D7420). Note that the chunk ID string ends with the space character (0x20). The chunk data size is equal to the size of the Num Cue Points value (4) plus the number of following cue points multiplied by the size of each cue point's data (24). The following formula can be used to calculate a Cue Chunk's data size:

$$\text{ChunkDataSize} = 4 + (\text{NumCuePoints} * 24)$$

Num Cue Points

This value specifies the number of following cue points in this chunk.

List of Cue Points

A list of cue points is simply a set of consecutive cue point descriptions that follow the format described below.

Offset	Size	Description	Value
0x00	4	ID	unique identification value
0x04	4	Position	play order position
0x08	4	Data Chunk ID	RIFF ID of corresponding data chunk
0x0c	4	Chunk Start	Byte Offset of Data Chunk *
0x10	4	Block Start	Byte Offset to sample of First Channel
0x14	4	Sample Offset	Byte Offset to sample byte of First Channel

Cue Point Format

ID

Each cue point has a unique identification value used to associate cue points with information in other chunks. For example, a Label chunk contains text that describes a point in the wave file by referencing the associated cue point.

Position

The position specifies the sample offset associated with the cue point in terms of the sample's position in the final stream of samples generated by the play list. Said in another way, if a play list chunk is specified, the position value is equal to the sample number at which this cue point will occur during playback of the entire play list as defined by the play list's order. If no play list chunk is specified this value should be 0.

Data Chunk ID

This value specifies the four byte ID used by the chunk containing the sample that corresponds to this cue point. A Wave file with no play list is always "data". A Wave file with a play list containing both sample data and silence may be either "data" or "sInt".

Chunk Start

The Chunk Start value specifies the byte offset into the Wave List Chunk of the chunk containing the sample that corresponds to this cue point. This is the same chunk described by the Data Chunk ID value. If no Wave List Chunk exists in the Wave file, this value is 0. If a Wave List Chunk exists, this is the offset into the "wavi" chunk. The first chunk in the Wave List Chunk would be specified with a value of 0.

Block Start

The Block Start value specifies the byte offset into the "data" or "sInt" Chunk to the start of the block containing the sample. The start of a block is defined as the first byte in uncompressed PCM wave data or the last byte in compressed wave data where decompression

can begin to find the value of the corresponding sample value.

Sample Offset

The Sample Offset specifies an offset into the block (specified by Block Start) for the sample that corresponds to the cue point. In uncompressed PCM waveform data, this is simply the byte offset into the "data" chunk. In compressed waveform data, this value is equal to the number of samples (may or may not be bytes) from the Block Start to the sample that corresponds to the cue point.

Playlist Chunk - "plst"

The playlist chunk specifies the play order of a series of cue points. The cue points are defined in the cue chunk, somewhere else in the file. A playlist consists of an array of segments, each containing information about what sample the segment should start playing from, how long the segment is (in samples) and how many times to repeat the segment before moving on to the next segment in the play order.

Offset	Size	Description	Value
0x00	4	Chunk ID	"plst" (0x736C6E74)
0x04	4	Chunk Data Size	num segments * 12
0x08	4	Number of Segments	1 - 0xFFFFFFFF
0x0a		List of Segments	

Playlist Chunk Format

Number of Segments

This value specifies the number of following segments in the playlist chunk.

List of Segments

A list of segments is simply a set of consecutive segment descriptions that follow the format described below. The segments do not have to be in any particular order because each segments associated cue point position is used to determine the play order.

Offset	Size	Description	Value
0x00	4	Cue Point ID	0 - 0xFFFFFFFF
0x04	4	Length (in samples)	1 - 0xFFFFFFFF
0x08	4	Number of Repeats	1 - 0xFFFFFFFF

Segment Format

Cue Point ID

The Cue Point ID specifies the starting sample for this segment by providing the value of a Cue Point defined in the Cue Point List. The ID that associates this segment with a Cue Point must be unique to all other segment Cue Point IDs.

Length

The Segment Length specifies the number of samples to play/loop from the starting sample defined by the associated Cue Point.

Number of Repeats

The number of repeats determines how many times this segment should be looped before playback should continue onto the next segment.

Associated Data List Chunk - "list"

An associated data list chunk is used to define text labels and names which are associated with the cue points to provide each text label or name a position.

Offset	Size	Description	Value
0x00	4	Chunk ID	"list" (0x6C696E74)
0x04	4	Chunk Data Size	depends on contained text
0x08	4	Type ID	"adtl" (0x6164746C)
0x0c		List of Text Labels and Names	

Associated Data List Chunk Format

Type ID

The type ID is used to identify the type of associated data list and is always "adtl".

List of Text Labels and Names

The list of text labels and names is a list of assorted chunks that define text in different ways. The three main chunk types that are used in WAVE files are the Label Chunk, Note Chunk and Labeled Text Chunk.

Label Chunk - "labl"

The label chunk is always contained inside of an associated data list chunk. It is used to associate a text label with a Cue Point. This information is often displayed next to markers or flags in digital audio editors.

Offset	Size	Description	Value
0x00	4	Chunk ID	"labl" (0x6C61626C)
0x04	4	Chunk Data Size	depends on contained text
0x08	4	Cue Point ID	0 - 0xFFFFFFFF
0x0c		Text	
Label Chunk Format			

Cue Point ID

The Cue Point ID specifies the sample point that corresponds to this text label by providing the ID of a Cue Point defined in the Cue Point List. The ID that associates this label with a Cue Point must be unique to all other label Cue Point IDs.

Text

The text is a null terminated string of characters. If the number of characters in the string is not even, padding must be appended to the string. The appended padding is not considered in the label chunk's chunk size field.

Note Chunk - "note"

The label chunk is always contained inside of an associated data list chunk. It is used to associate a text comment with a Cue Point. This information is stored in an identical fashion to the labels in the label chunk.

Offset	Size	Description	Value
0x00	4	Chunk ID	"note" (0x6E6F7465)
0x04	4	Chunk Data Size	depends on contained text
0x08	4	Cue Point ID	0 - 0xFFFFFFFF
0x0C		Text	
Label Chunk Format			

Cue Point ID

The Cue Point ID specifies the sample point that corresponds to this text comment by providing the ID of a Cue Point defined in the Cue Point List. The ID that associates this label with a Cue Point must be unique to all other note chunk Cue Point IDs.

Text

The text is a null terminated string of characters. If the number of characters in the string is not even, padding must be appended to the string. The appended padding is not considered in the note chunk's chunk size field.

Labeled Text Chunk - "ltxl"

The labeled text chunk is always contained inside of an associated data list chunk. It is used to associate a text label with a region or section of waveform data. This information is often displayed in marked regions of a waveform in digital audio editors.

Offset	Size	Description	Value
0x00	4	Chunk ID	"ltxl" (0x6C747874)
0x04	4	Chunk Data Size	depends on contained text
0x08	4	Cue Point ID	0 - 0xFFFFFFFF
0x0c	4	Sample Length	0 - 0xFFFFFFFF
0x10	4	Purpose ID	0 - 0xFFFFFFFF
0x12	2	Country	0 - 0xFFFF
0x14	2	Language	0 - 0xFFFF
0x16	2	Dialect	0 - 0xFFFF
0x18	2	Code Page	0 - 0xFFFF
0x1A		Text	
Label Chunk Format			

Cue Point ID

The Cue Point ID specifies the starting sample point that corresponds to this text label by providing the ID of a Cue Point defined in the Cue Point List. The ID that associates this label with a Cue Point must be unique to all other note chunk Cue Point IDs.

Sample Length

The sample length defines how many samples from the cue point the region or section spans.

Purpose ID

The purpose field specifies what the text is used for. For example a value of "scrp" means script text, and "capt" means close-caption. There are several more purpose IDs, but they are meant to be used with other types of RIFF files (not usually found in WAVE files).

Country, Language, Dialect and Code Page

These fields are used to specify information about the location and language used by the text and are typically used for queries to obtain information from the operating system.

Text

The text is a null terminated string of characters. If the number of characters in the string is not even, padding must be appended to the string. The appended padding is not considered in the note chunk's chunk size field.

Sampler Chunk - "smpl"

Offset	Size	Description	Value
0x00	4	Chunk ID	"smpl" (0x736D706C)
0x04	4	Chunk Data Size	36 + (Num Sample Loops * 24) + Sampler Data
0x08	4	Manufacturer	0 - 0xFFFFFFFF
0x0C	4	Product	0 - 0xFFFFFFFF
0x10	4	Sample Period	0 - 0xFFFFFFFF
0x14	4	MIDI Unity Note	0 - 127
0x18	4	MIDI Pitch Fraction	0 - 0xFFFFFFFF
0x1C	4	SMPTE Format	0, 24, 25, 29, 30
0x20	4	SMPTE Offset	0 - 0xFFFFFFFF
0x24	4	Num Sample Loops	0 - 0xFFFFFFFF
0x28	4	Sampler Data	0 - 0xFFFFFFFF
0x2C		List of Sample Loops	
		Sampler Chunk Format	

Manufacturer

The manufacturer field specifies the MIDI Manufacturer's Association (MMA) Manufacturer code for the sampler intended to receive this file's waveform. Each manufacturer of a MIDI product is assigned a unique ID which identifies the company. If no particular manufacturer is to be specified, a value of 0 should be used.

The value is stored with some extra information to enable translation to the value used in a MIDI System Exclusive transmission to the sampler. The high byte indicates the number of low order bytes (1 or 3) that are valid for the manufacturer code. For example, the value for Digidesign will be 0x01000013 (0x13) and the value for Microsoft will be 0x30000041 (0x00, 0x00, 0x41). See the [MIDI Manufacturers List](#) for a list.

Product

The product field specifies the MIDI model ID defined by the manufacturer corresponding to the Manufacturer field. Contact the manufacturer of the sampler to get the model ID. If no particular manufacturer's product is to be specified, a value of 0 should be used.

Sample Period

The sample period specifies the duration of time that passes during the playback of one sample in nanoseconds (normally equal to 1 / Samplers Per Second, where Samplers Per Second is the value found in the format chunk).

MIDI Unity Note

The MIDI unity note value has the same meaning as the instrument chunk's MIDI Unshifted Note field which specifies the musical note at which the sample will be played at it's original sample rate (the sample rate specified in the format chunk).

MIDI Pitch Fraction

The MIDI pitch fraction specifies the fraction of a semitone up from the specified MIDI unity note field. A value of 0x80000000 means 1/2 semitone (50 cents) and a value of 0x00000000 means no fine tuning between semitones.

SMPTE Format

The SMPTE format specifies the Society of Motion Pictures and Television E time format used in the following SMPTE Offset field. If a value of 0 is set, SMPTE Offset should also be set to 0.

Value	SMPTE Format
0	no SMPTE offset
24	24 frames per second
25	25 frames per second
29	30 frames per second with frame dropping (30 drop)
30	30 frames per second

SMPTE Format Values

SMPTE Offset

The SMPTE Offset value specifies the time offset to be used for the synchronization / calibration to the first sample in the waveform. This value uses a format of 0xhhmmssff where hh is a signed value that specifies the number of hours (-23 to 23), mm is an unsigned value that specifies the number of minutes (0 to 59), ss is an unsigned value that specifies the number of seconds (0 to 59) and ff is an unsigned value that specifies the number of frames (0 to -1).

Sample Loops

The sample loops field specifies the number Sample Loop definitions in the following list. This value may be set to 0 meaning that no sample loops follow.

Sampler Data

The sampler data value specifies the number of bytes that will follow this chunk (including the entire sample loop list). This value is greater than 0 when an application needs to save additional information. This value is reflected in this chunk's data size value.

List of Sample Loops

A list of sample loops is simply a set of consecutive loop descriptions that follow the format described below. The sample loops do not have to be in any particular order because each sample loop associated cue point position is used to determine the play order. The sampler chunk is optional.

Offset	Size	Description	Value
0x00	4	Cue Point ID	0 - 0xFFFFFFFF
0x04	4	Type	0 - 0xFFFFFFFF
0x08	4	Start	0 - 0xFFFFFFFF
0x0C	4	End	0 - 0xFFFFFFFF
0x10	4	Fraction	0 - 0xFFFFFFFF
0x14	4	Play Count	0 - 0xFFFFFFFF

Sample Loop Format

Cue Point ID

The Cue Point ID specifies the unique ID that corresponds to one of the defined cue points in the cue point list. Furthermore, this ID corresponds to any labels defined in the associated data list chunk which allows text labels to be assigned to the various sample loops.

Type

The type field defines how the waveform samples will be looped.

Value	Loop Type
0	Loop forward (normal)
1	Alternating loop (forward/backward, also known as Ping Pong)
2	Loop backward (reverse)
3 - 31	Reserved for future standard types
32 - 0xFFFFFFFF	Sampler specific types (defined by manufacturer)

Loop Type Values

Start

The start value specifies the byte offset into the waveform data of the first sample to be played in the loop.

End

The end value specifies the byte offset into the waveform data of the last sample to be played in the loop.

Fraction

The fractional value specifies a fraction of a sample at which to loop. This allows a loop to be fine tuned at a resolution greater than one sample. The value can range from 0x00000000 to 0xFFFFFFFF. A value of 0 means no fraction, a value of 0x80000000 means 1/2 of a sample length. 0xFFFFFFFF is the smallest fraction of a sample that can be represented.

Play Count

The play count value determines the number of times to play the loop. A value of 0 specifies an infinite sustain loop. An infinite sustain loop will continue looping until some external force interrupts playback, such as the musician releasing the key that triggered the wave's playback. All other values specify an absolute number of times to loop.

Instrument Chunk - "inst"

The instrument chunk is used to describe how the waveform should be played as an instrument sound. This information is useful for communicating musical information between sample-based music programs, such as trackers or software wavetables. This chunk is optional and no more than 1 may appear in a WAVE file.

Offset	Size	Description	Value
--------	------	-------------	-------

0x00	4	Chunk ID	"Itxt" (0x6C747874)
0x04	4	Chunk Data Size	7
0x08	1	Unshifted Note	0 - 127
0x09	1	Fine Tune (dB)	-50 - +50
0x0A	1	Gain	-64 - +64
0x0B	1	Low Note	0 - 127
0x0C	1	High Note	0 - 127
0x0D	1	Low Velocity	1 - 127
0x0E	1	High Velocity	1 - 127

Instrument Chunk Format

Unshifted Note

The unshifted note field has the same meaning as the sampler chunk's MIDI Unity Note which specifies the musical note at which the sample will be played at it's original sample rate (the sample rate specified in the format chunk).

Fine Tune

The fine tune value specifies how much the sample's pitch should be altered when the sound is played back in cents (1/100 of a semitone). A negative value means that the pitch should be played lower and a positive value means that it should be played at a higher pitch.

Gain

The gain value specifies the number of decibels to adjust the output when it is played. A value of 0dB means no change, 6dB means double the amplitude of each sample and -6dB means to halve the amplitude of each sample. Every additional +/-6dB will double or halve the amplitude again.

Low Note and High Note

The note fields specify the MIDI note range for which the waveform should be played when receiving MIDI note events (from software or triggered by a MIDI controller). This range does not need to include the Unshifted Note value.

Low Velocity and High Velocity

The velocity fields specify the range of MIDI velocities that should cause the waveform to be played. 1 being the lightest amount and 127 being the hardest.

Format Variations

The down side to the Wave file format's popularity is that out of the hundreds of programs that support it, many abuse or misuse it due to bad programming and/or poor documentation. Once some of these "naughty" programs get fairly popular and churn out millions of incorrect Wave files, the rest of the software industry is forced to deal with it and write code that can read the incorrect files. New code should never write these errors, but possibly read them. Below are a few exceptions that have been made to the strict/original Wave file format.

- Incorrect Block Alignment value - this can be dealt with by calculating the Block Alignment with the formula mentioned above.
- Incorrect Average Samples Per Second value - this can be dealt with by calculating the Average Samples Per Second with the formula mentioned above.
- Missing word alignment padding - this can be difficult to deal with, but can be done by giving the user a warning when unrecognized chunk ID's are encountered where a one byte read offset produces a recognized chunk ID. This is not a concrete solution, but will usually work even if the program doesn't have a comprehensive list of legal IDs.

Related

Links: [Streaming Wave Files with DirectSound](#)

Sound File Converter

Download free software to convert between over 20 audio file formats.
www.nch.com.au/switch

PowerPoint to Video

Convert PowerPoint to DVD-quality Video in AVI, WMV and MPEG format!
www.presentersoft.com

Family Trees Online

Search Or Start Your Family Tree. Easy To Use & Share. Free Trial!
www.Ancestry.ca

Microfilm Imaging Archive

Microfilm scanning service, Imaging Convert documents in digital format
www.micromatt.com

[Ads by Google](#)

[Advertise on this site](#)

Copyright © 1999-2006 Sonic Spot
[About Us](#) | [Privacy Statement](#)

Exhibit "A-4"

Wikipedia site owned by Wikimedia Foundation, Inc.

EXHIBIT NO. A-4
EXAM OF CHRISTOPHER CRAIG
DATE NOV. 17/06
REPORTER S. H.
ASAP Reporting Services Inc.

WAV

From Wikipedia, the free encyclopedia

WAV (or **WAVE**), short for Waveform audio format, is a Microsoft and IBM audio file format standard for storing audio on PCs. It is a variant of the RIFF bitstream format method for storing data in "chunks", and thus also close to the IFF and the AIFF format used on Macintosh computers. Both WAVs and AIFFs are compatible with Windows and Macintosh operating systems. It takes into account some differences of the Intel CPU such as little-endian byte order. The RIFF format acts as a "wrapper" for various audio compression codecs. It is the main format used on Windows systems for raw audio.

Though a WAV file can hold compressed audio, the most common WAV format contains uncompressed audio in the pulse-code modulation (PCM) format. PCM audio is the standard audio file format for CDs at 44,100 samples per second, 16 bits per sample. Since PCM uses an uncompressed, lossless storage method, which keeps all the samples of an audio track, professional users or audio experts may use the WAV format for maximum audio quality. WAV audio can also be edited and manipulated with relative ease using software.

Waveform

File extension:	.wav
MIME type:	audio/wav audio/wave
Type code:	WAVE
Uniform Type	com.microsoft.waveform-□
Identifier:	audio
Developed by:	Microsoft & IBM
Type of format:	audio file
Extended from:	RIFF

Contents

- 1 Popularity
- 2 Limitations
- 3 Audio CDs
- 4 See also
- 5 External links

Popularity

As file sharing over the Internet has become popular, the WAV format has declined in popularity, primarily because uncompressed WAV files are quite large in size. More frequently, compressed but lossy formats such as MP3, AAC, Ogg and WMA are used to store and transfer audio, since their smaller file sizes allow for faster transmission over the internet as well as lower disk space consumption. There are also more efficient lossless codecs available, such as Monkey's Audio, TTA, WavPack, FLAC, Shorten, Apple Lossless and WMA Lossless.

The usage of the WAV format has more to do with its simplicity and simple structure, which is heavily based on the IFF file format. Because of this, it continues to enjoy widespread use with a variety of software applications, often functioning as a lowest common denominator when it comes to exchanging sound files between different programs.

Limitations

The WAV format is limited to files that are less than 4 GiB in size, due to its use of a 32 bit unsigned integer to record the file size header (some programs limit the file size to 2 GiB). Although this is equivalent to about 6.6 hours of CD-quality audio (44.1 kHz, 16-bit stereo), it is sometimes necessary to go over this limit. The **W64** format was therefore created for use in Sound Forge. Its 64-

bit header allows for much longer recording times. This format can be converted using the libsndfile library. The **RF64** format specified by the European Broadcasting Union has also been created to solve this problem.

Audio CDs

Audio CDs do not use WAV as their sound format, instead using Red Book audio. The commonality is that both audio CDs and WAV files have the audio data encoded in PCM. WAV is a data file format for computer use. If one were to transfer an audio CD bit stream to WAV files and record them onto a CD-R as a data disc (in ISO format), the CD could not be played in a player that was only designed to play audio CDs.

See also

- BWF, Broadcast Wave Format
- RF64, An extended File Format for Audio (multichannel file format enabling file sizes to exceed 4 Gbyte)

External links

- A summary of the WAVE file format (<http://ccrma.stanford.edu/courses/422/projects/WaveFormat/>)
- Another summary of WAVE file format (<http://www.sonicspot.com/guide/wavefiles.html>)
- Wotsit's file format information for WAV (<http://www.wotsit.org/search.asp?page=8&s=music>)
- WAV file format (<http://www.borg.com/~jglatt/tech/wave.htm>)
- Basic WAV file format (<http://technology.niagarac.on.ca/courses/ctec1631/WavFileFormat.html>)
- A detailed explanation of digital audio formats and best practices (pdf) (http://www.cdpheritage.org/digital/audio/documents/CDPDABP_1-2.pdf)

Exhibit "A-5"
Sample of Book References

EXHIBIT NO.

A-5

EXAM OF

CHRISTOPHER CRAIG

DATE

Nov. 17/06

REPORTED BY

SK

ASAP Reporting Services, Inc.

"With maximum zest and a minimum of jargon, Elisabeth Parker shows you how to get those effects that make Web surfers bookmark your Home Page!"

—from the foreword by Andy and Tina Rathbone, authors of Windows® 95 for Dummies® and Modems for Dummies®

A COMPLETE HOME PAGE IMPROVEMENT TOOL KIT ON CD-ROM

INCLUDING over 60 freeware,
shareware, and trial versions
of powerful Web-savvy
applications for
Windows
& Mac

HOME PAGE IMPROVEMENT

→ **"GEE, HOW DID YOU DO THAT?"**
Dazzle your friends and colleagues with dynamite Web pages!

→ **NO DESIGN EXPERIENCE . . .**
→ **NO PROGRAMMING SKILLS . . .**
→ **NO COSTLY EQUIPMENT REQUIRED!**

ELISABETH A. PARKER

Home Page Improvement

Published by IDG Books Worldwide, Inc.

An International Data Group Company

919 E. Hillsdale Blvd., Suite 400 Foster City, CA 94404

www.idgbooks.com (IDG Books Worldwide Web site)

Copyright © 1997 IDG Books Worldwide, Inc. All rights reserved. No part of this book, including interior design, cover design, and icons, may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording, or otherwise) without the prior written permission of the publisher.

Library of Congress Catalog Card No.: 97-72191

ISBN: 0-7645-3083-6

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

10/QT/QX/ZX/FC

Distributed in the United States by IDG Books Worldwide, Inc.

Distributed by Macmillan Canada for Canada; by Contemporanea de Ediciones for Venezuela; by Distribuidora Cuspide for Argentina; by CITEC for Brazil; by Ediciones ZETA S.C.R. Ltda. for Peru; by Editorial Limusa SA for Mexico; by Transworld Publishers Limited in the United Kingdom and Europe; by Academic Bookshop for Egypt; by Levant Distributors S.A.R.L. for Lebanon; by Al Jassim for Saudi Arabia; by Simron Pty. Ltd. for South Africa; by Pustak Mahal for India; by The Computer Bookshop for India; by Toppan Company Ltd. for Japan; by Addison Wesley Publishing Company for Korea; by Longman Singapore Publishers Ltd. for Singapore, Malaysia, Thailand, and Indonesia; by Unalis Corporation for Taiwan; by WS Computer Publishing Company, Inc. for the Philippines; by WoodsLane Pty. Ltd. for Australia; by WoodsLane Enterprises Ltd. for New Zealand. Authorized Sales Agent: Anthony Rudkin Associates for the Middle East and North Africa.

For general information on IDG Books Worldwide's books in the U.S., please call our Consumer Customer Service department at 800-762-2974. For reseller information, including discounts and premium sales, please call our Reseller Customer Service department at 800-434-3422.

For information on where to purchase IDG Books Worldwide's books outside the U.S., please contact our International Sales department at 415-655-3172 or fax 415-655-3295.

For information on foreign language translations, please contact our Foreign & Subsidiary Rights department at 415-655-3021 or fax 415-655-3281.

For sales inquiries and special prices for bulk quantities, please contact our Sales department at 415-655-3200 or write to the address above.

For information on using IDG Books Worldwide's books in the classroom or for ordering examination copies, please contact our Educational Sales department at 800-434-2086 or fax 817-251-8174.

For authorization to photocopy items for corporate, personal, or educational use, please contact Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, or fax 508-750-4470.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: AUTHOR AND PUBLISHER HAVE USED THEIR BEST EFFORTS IN PREPARING THIS BOOK. IDG BOOKS WORLDWIDE, INC., AND AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS BOOK AND SPECIFICALLY DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS CONTAINED IN THIS PARAGRAPH. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES REPRESENTATIVES OR WRITTEN SALES MATERIALS. THE ACCURACY AND COMPLETENESS OF THE INFORMATION PROVIDED HEREIN AND THE OPINIONS STATED HEREIN ARE NOT GUARANTEED OR WARRANTED TO PRODUCE ANY PARTICULAR RESULTS, AND THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY INDIVIDUAL. NEITHER IDG BOOKS WORLDWIDE, INC., NOR AUTHOR SHALL BE LIABLE FOR ANY LOSS OF PROFIT OR ANY OTHER COMMERCIAL DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES.

Trademarks: All brand names and product names used in this book are trade names, service marks, trademarks, or registered trademarks of their respective owners. IDG Books Worldwide is not associated with any product or vendor mentioned in this book.



is a trademark under exclusive
license to IDG Books Worldwide, Inc.,
from International Data Group, Inc.

Eight
Comp
Award

IDG Book
Data Gro
Buyer's G
Compu
PC Playe
InfoWorl
AND SL
Damm
America
Compu
America
ICELAN
Publish
Macworl
NACED
NEIHEI
Compu
Rappor
Fama
Weekl
Compu
Circul
Telecom
SA, Sof
Corpor
Compu
FIRKE
Asian U
World, F
and Sun

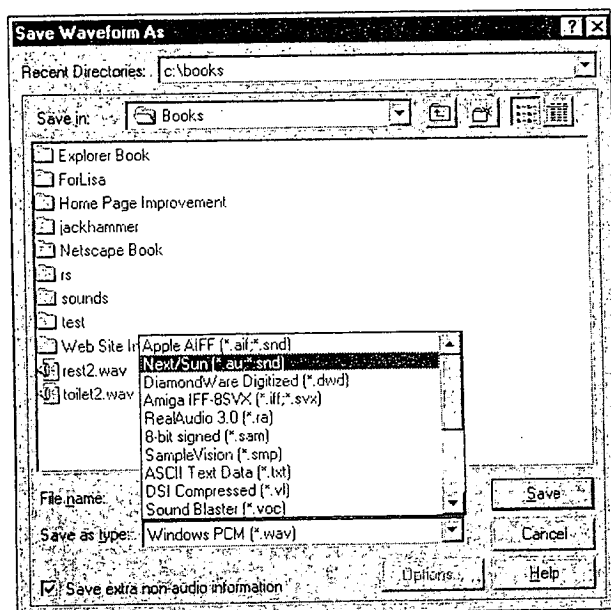


Figure 13-9

Save your WAV file to an AU file.

6. Click the Options button and select the mu-Law 8-bit radio button from the NeXT/Sun AU Format dialog box, as shown in Figure 13-10, and then click OK to return to the Save Waveform As dialog box.

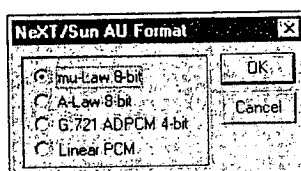


Figure 13-10

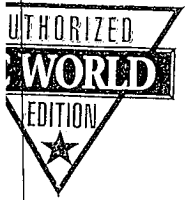
Select the mu-Law 8-bit radio button.

7. Save and name your file.

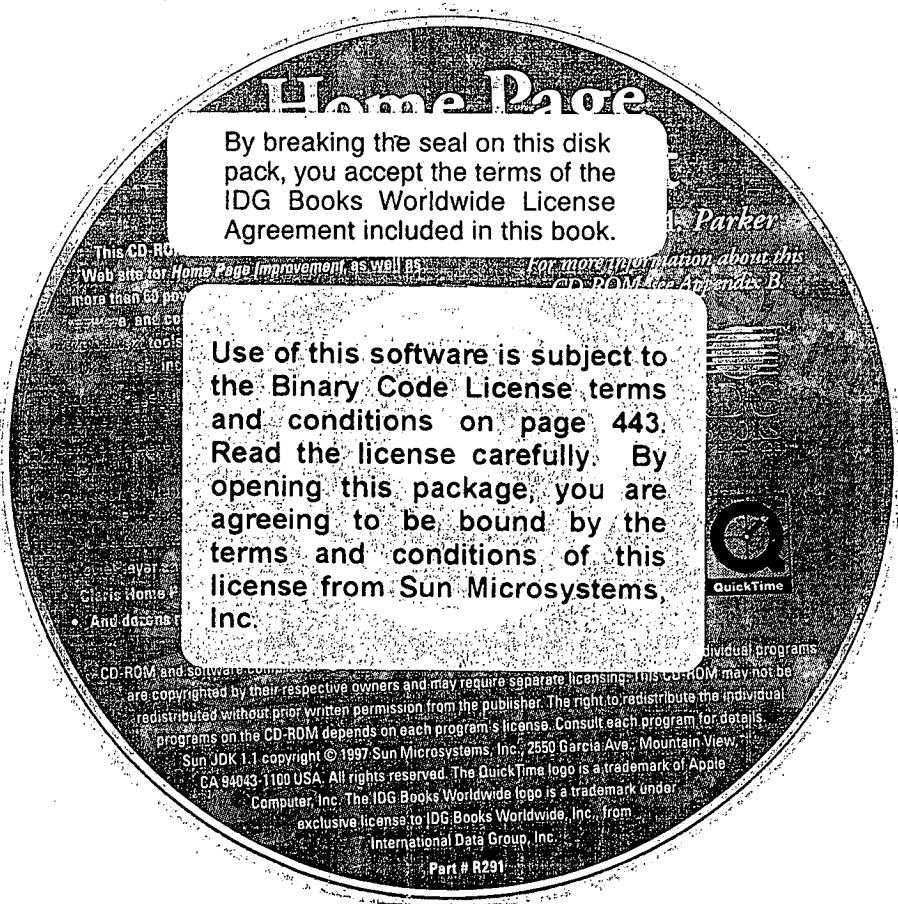
GoldWave (Windows)

If you really want to explore Windows sound programs, don't overlook Chris Craig's \$30.00 shareware program, GoldWave, as shown in Figure 13-11. On one hand, it's definitely aimed more at musical users with a certain level of technical knowledge. On the other hand, this shareware program is fully functional and has many of the same features as CoolEdit. Download the latest version from <http://www.cs.mun.ca/~chris3/goldwave/>. Or you can take the version on the companion CD-ROM for a spin.

Knowledge.



POSTAGE
NECESSARY
MAILED
IN THE
UNITED STATES



By breaking the seal on this disk pack, you accept the terms of the IDG Books Worldwide License Agreement included in this book.

Use of this software is subject to the Binary Code License terms and conditions on page 443. Read the license carefully. By opening this package, you are agreeing to be bound by the terms and conditions of this license from Sun Microsystems, Inc.

This CD-ROM contains the Home Page (Improvement), as well as more than 60 pages of text, graphics, and sound files. For more information about this software, see Appendix B.

CD-ROM and software are copyrighted by their respective owners and may require separate licensing. This CD-ROM may not be redistributed without prior written permission from the publisher. The right to redistribute the individual programs on the CD-ROM depends on each program's license. Consult each program for details.

Sun JDK 1.1 copyright © 1997 Sun Microsystems, Inc., 2550 Garcia Ave., Mountain View, CA 94043-1100 USA. All rights reserved. The QuickTime logo is a trademark of Apple Computer, Inc. The IDG Books Worldwide logo is a trademark under exclusive license to IDG Books Worldwide, Inc., from International Data Group, Inc.

Part # R291

*Harness the power of this new animation tool
—from creating images to adding special effects*

Carrara™ 1

FOR

DUMMIES®

*A Reference
for the
Rest of Us!®*

Doug Sahlin
Author of Carrara™ 1 Bible

*CD-ROM packed
with software demos
and 3D models*



Carrara™ 1 For Dummies®

Published by
IDG Books Worldwide, Inc.
An International Data Group Company
919 E. Hillsdale Blvd.
Suite 400
Foster City, CA 94404
www.idgbooks.com (IDG Books Worldwide Web site)
www.dummies.com (Dummies Press Web site)

Copyright © 2000 IDG Books Worldwide, Inc. All rights reserved. No part of this book, including interior design, cover design, and icons, may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording, or otherwise) without the prior written permission of the publisher.

Library of Congress Control Number: 00-101256

ISBN: 0-7645-0656-0

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

10/RQ/QW/QQ/IN

Distributed in the United States by IDG Books Worldwide, Inc.

Distributed by CDG Books Canada Inc. for Canada; by Transworld Publishers Limited in the United Kingdom; by IDG Norge Books for Norway; by IDG Sweden Books for Sweden; by IDG Books Australia Publishing Corporation Pty. Ltd. for Australia and New Zealand; by TransQuest Publishers Pte Ltd. for Singapore, Malaysia, Thailand, Indonesia, and Hong Kong; by Gotop Information Inc. for Taiwan; by ICG Muse, Inc. for Japan; by Intersoft for South Africa; by Eyrolles for France; by International Thomson Publishing for Germany, Austria and Switzerland; by Distribuidora Cuspidor for Argentina; by LR International for Brazil; by Galileo Libros for Chile; by Ediciones ZETA S.C.R. Ltda. for Peru; by WS Computer Publishing Corporation, Inc., for the Philippines; by Contemporanea de Ediciones for Venezuela; by Express Computer Distributors for the Caribbean and West Indies; by Micronesia Media Distributor, Inc. for Micronesia; by Chips Computadoras S.A. de C.V. for Mexico; by Editorial Norma de Panama S.A. for Panama; by American Bookshops for Finland.

For general information on IDG Books Worldwide's books in the U.S., please call our Consumer Customer Service department at 800-762-2974. For reseller information, including discounts and premium sales, please call our Reseller Customer Service department at 800-434-3422.

For information on where to purchase IDG Books Worldwide's books outside the U.S., please contact our International Sales department at 317-596-5530 or fax 317-572-4002.

For consumer information on foreign language translations, please contact our Customer Service department at 1-800-434-3422, fax 317-572-4002, or e-mail rights@idgbooks.com.

For information on licensing foreign or domestic rights, please phone +1-650-653-7098.

For sales inquiries and special prices for bulk quantities, please contact our Order Services department at 800-434-3422 or write to the address above.

For information on using IDG Books Worldwide's books in the classroom or for ordering examination copies, please contact our Educational Sales department at 800-434-2086 or fax 317-572-4005.

For press review copies, author interviews, or other publicity information, please contact our Public Relations department at 650-653-7000 or fax 650-653-7500.

For authorization to photocopy items for corporate, personal, or educational use, please contact Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, or fax 978-750-4470.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND AUTHOR HAVE USED THEIR BEST EFFORTS IN PREPARING THIS BOOK. THE PUBLISHER AND AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS BOOK AND SPECIFICALLY DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS CONTAINED IN THIS PARAGRAPH. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES REPRESENTATIVES OR WRITTEN SALES MATERIALS. THE ACCURACY AND COMPLETENESS OF THE INFORMATION PROVIDED HEREIN AND THE OPINIONS STATED HEREIN ARE NOT GUARANTEED OR WARRANTED TO PRODUCE ANY PARTICULAR RESULTS, AND THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY INDIVIDUAL. NEITHER THE PUBLISHER NOR AUTHOR SHALL BE LIABLE FOR ANY LOSS OF PROFIT OR ANY OTHER COMMERCIAL DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES.

Trademarks: Carrara 1 is a trademark of MetaCreations Corporation. For Dummies, Dummies Man, A Reference for the Rest of Us!, The Dummies Way, Dummies Daily, and related trade dress are registered trademarks or trademarks of IDG Books Worldwide, Inc. in the United States and other countries, and may not be used without written permission. All other trademarks are the property of their respective owners. IDG Books Worldwide is not associated with any product or vendor mentioned in this book.



is a registered trademark under exclusive license to IDG Books Worldwide, Inc. from International Data Group, Inc.

- ✓ **Canoma**, from MetaCreations Corporation (www.metacreations.com), *For Windows and Mac OS. Trial version.* Canoma is a unique program that creates 3D objects from photographs. Use it to create models of objects composed of strict geometric shapes such as triangles and rectangles. It's great for adding buildings to your Carrara scenes.
- ✓ **GoldWave 4.12**, from Chris Craig (www.goldwave.com), *For Windows only. Shareware.* GoldWave is a sophisticated audio-editing program that you can use to create sound tracks. This software is the perfect companion to VideoWave III.
- ✓ **Toon!**, from Digital Carvers Guild (www.digitalcarversguild.com), *For Windows and Mac OS. Evaluation version.* If you want a little *Biff, Bam, Socko, eat-my-shorts* in your rendered image, leave it to Toon! to render your scenes as cartoon illustrations. Toon! is way kewl for Metaball models and caped super heroes. All that's missing are the bubble captions, which you'll have to add after the fact.
- ✓ **VideoWave III**, from MGI Software (www.mgisoft.com), *For Windows only. Trial version.* Use this video-editing software program to splice Carrara animations together and add soundtracks to them. The program comes complete with sophisticated text and transition effects.



Animations take a long time to render. Depending upon the complexity of the scene, a two minute animation can tie up your computer for the better part of a day and night and then some. I recommend rendering any long animation in pieces and then splicing the whole thing together with a video-editing program like MGI's VideoWave III. The program can also be used to add a soundtrack to the spliced video that you create by using an audio-editing program, such as GoldWave 4.12.

Creating and modifying effects

The neat thing about Carrara is that it features an open architecture, which means that after-market software vendors (techno-geek for programmers by any other name) can create plug-ins to augment the program. The two light plug-ins included on the CD-ROM offer added versatility by giving you more lighting options for your Carrara scenes. They are

- ✓ **Anything Glows**, from Digital Carvers Guild (www.digitalcarversguild.com), *For Windows and Mac OS. Evaluation version.* This plug-in light enables you to use any object as a source of light. Glow shaded objects really glow!
- ✓ **Freeware Pack 1**, from Lost Horizons Software (www.losthorizonsoftware.com), *For Windows and Mac OS. Freeware.* This Carrara plug-in adds some useful functions to the Carrara Shader Tree Editor.

MADE BY ZOMAX CANADA

REST OF THE WORLD!

IDG BOOKS WORLDWIDE

BESTSELLING FOR DUMMIES BOOK SERIES

FOR DUMMIES

CD-ROM and software compilation
copyright © 2000 IDG books,
Inc. All rights reserved.
Individual programs are copyrighted
by their respective owners and may
require separate licensing. This
work will be revised. This
without prior permission
on the program. Reproduction
program and its contents on the
IDG books logo is the IDG books
logo. No other reproduction
IDG books logo is prohibited.
IDG books logo is the IDG books
logo. No other reproduction
IDG books logo is prohibited.
IDG books logo is the IDG books
logo. No other reproduction
IDG books logo is prohibited.

To install the CD-ROM, please
see the installation instructions
page at the end of this book.
For more information on IDG
Books Worldwide's titles,
please call 800-762-2974.

John Wiley & Sons, Inc.
Publishers Since 1807



WILEY

111 River Street
Hoboken, NJ 07030
www.wiley.com
TEL 201.748.6000
FAX 201.748.6088

Chris Craig
GoldWave Inc.
P.O. Box 51
St. John's, NFLD A1C 5H5
Canada

August 30, 2002

Dear Chris Craig:

On behalf of Mark Miller, Wiley Technology Publishing is pleased to present you with a copy of his new book, *VoiceXML: 10 Projects to Voice-Enable Your Web-Site*.

VoiceXML is rapidly becoming the de facto language standard for handling the transition from visual Web browsing to synthesized text-to-speech information access. This book provides Web designers, database managers, and systems designers with all the tools and templates they need to accomplish this transition in the least amount of time and at the lowest possible cost. Its ten projects walk readers step-by-step through real world applications—from statement of the problem through code examination, error checking, and deployment—to clearly demonstrate how to use currently available tools, techniques, and strategies for building Internet voice applications.

Wiley is excited about this book, and we hope that you will find it exciting as well. I would enjoy hearing your thoughts, and I would certainly appreciate your helping us to spread the word about the book by posting comments at your favorite online account. If you find that you would like more copies, substantial discounts are available for quantity purchases. Contact Sam Testa at 201-748-6789 or stesta@wiley.com for more information.

Sincerely,

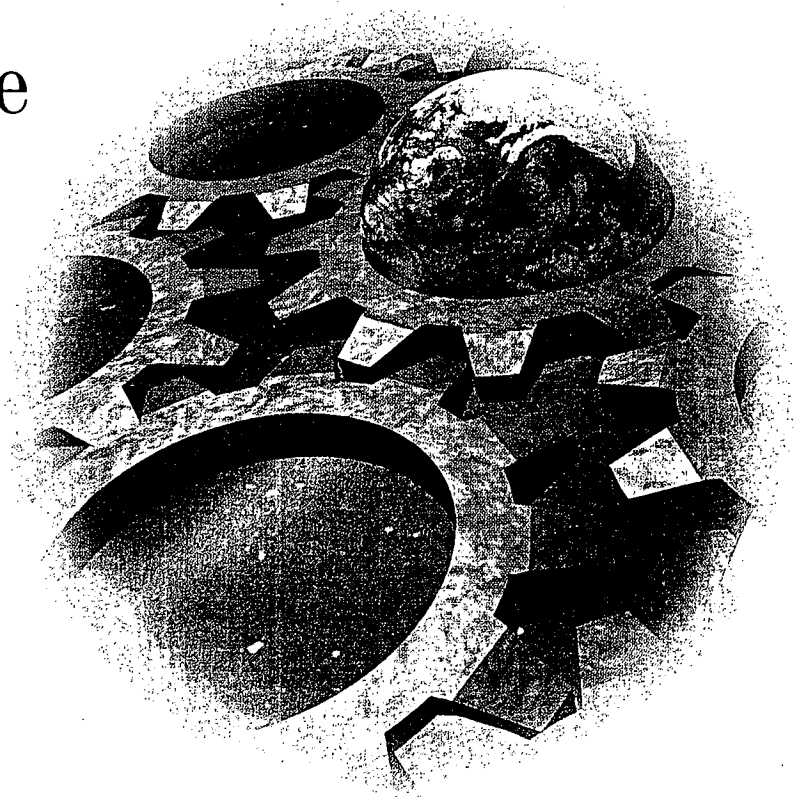
Jennifer Bergman
Marketing Manager
Wiley Technology Publishing
jbergman@wiley.com

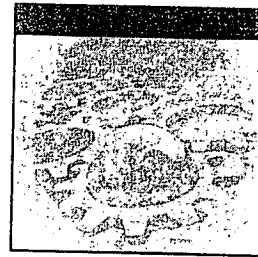


VoiceXML

10 Projects
to Voice-Enable
Your Web Site

Mark Miller





VoiceXML: 10 Projects to Voice Enable Your Web Site

Mark Miller

Gearhead Press™



Wiley Publishing, Inc.

Publisher: Robert Ipsen
Editor: Ben Ryan
Consulting Editor: Donis Marshall
Developmental Editor: Kathryn A. Malm
Managing Editor: Angela Smith
New Media Editor: Brian Snapp
Text Design & Composition: John Wiley Composition Services

Designations used by companies to distinguish their products are often claimed as trademarks. In all instances where John Wiley & Sons, Inc., is aware of a claim, the product names appear in initial capital or ALL CAPITAL LETTERS. Readers, however, should contact the appropriate companies for more complete information regarding trademarks and registration.

This book is printed on acid-free paper. ☺

Copyright © 2002 by Mark Miller. All rights reserved.

Published by Wiley Publishing, Inc., New York

Published simultaneously in Canada.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 750-4744. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, (212) 850-6011, fax (212) 850-6008, E-Mail: PERMREQ @ WILEY.COM.

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in professional services. If professional advice or other expert assistance is required, the services of a competent professional person should be sought.

The Gearhead Press trademark is the exclusive property of Gearhead Group Corporation.

Library of Congress Cataloging-in-Publication Data:

ISBN: 0-471-20737-3

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic versions. For more information about Wiley products, visit our web site at www.wiley.com.

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

```

74.         You have accessed Mars Colony 7
75.         Security Information Center.
76.         <goto next="#goodbye"/>
77.     </block>
78. </form>
79.
80. <form id="goodbye">
81.     <block>
82.         Thank you for calling.
83.         Good Bye.
84.     </block>
85. </form>
86.
87. </vxml>

```

Listing 4.2. Verifying a caller's password. (*continued*)

<audio> Elements

Sometimes it is appropriate to output prerecorded audio in place of a TTS prompt. This is accomplished with the <audio> element. An <audio> element contains a *src* attribute that points to a sound file. If the sound file is not available, the content within the audio tag is output. The *fetchtimeout* attribute specifies a time in seconds for the interpreter to fetch the sound source before it plays the element's content.

Prerecorded audio files can come from many sources. For a simple application, recording your own prompts can be fun and instructive. The GoldWave Player at goldwave.com is a good tool for creating homemade prompts. A production-level application for paying clients should use professional voice recordings.

The greeting on line 35 of Listing 4.2 is contained within an <audio> element. The source file *authenticationWelcome.wav* has 2 seconds to play before the TTS mechanism overrides it and outputs the text content of the <audio> element.

Mapping Grammar Slots

As we have seen in previous projects, grammars are created to compare against user input for appropriate responses. A grammar term or phrase can also be mapped to a specific value. This is useful when multiple terms are synonymous for a single term, where the single term will be used as part of a comparison condition. In our case, a user's password needs to be mapped to a designated phone number and then checked against the caller's phone number.

The grammar of the *password* field in Listing 4.2 consists of a list of password terms or phrases mapped to an approved phone number, as shown on lines 40 through 42. It is assumed that the caller has been assigned a password before making the call. The grammar will recognize three phrases, each mapped to a different phone number. The mapping occurs after each grammar term or phrase is set.



Now You Can Use the Hottest Technology to Create
the Coolest Web Sites — No Programming Required!



JAVATM FOR DUMMIES[®] 3RD EDITION

**A Reference for
the Rest of Us!**

by Aaron E. Walsh

Author of *JavaTM Bible* and
Foundations of JavaTM



**The Fun and Easy WayTM
to Build State-of-the-Art
Web Sites**

**Your First Aid Kit[®]
for Installing and
Customizing Java
Desktop Applications**

**Java Development
Toolkit and Runtime
Environment — Explained
in Plain English**



Java™ For Dummies®, 3rd Edition

Published by
IDG Books Worldwide, Inc.
An International Data Group Company
919 E. Hillsdale Blvd.
Suite 400
Foster City, CA 94404
www.idgbooks.com (IDG Books Worldwide Web site)
www.dummies.com (Dummies Press Web site)

Copyright © 1998 IDG Books Worldwide, Inc. All rights reserved. No part of this book, including interior design, cover design, and icons, may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording, or otherwise) without the prior written permission of the publisher.

Library of Congress Catalog Card No.: 98-87435

ISBN: 0-7645-0417-7

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

3B/RV/QZ/ZY/IN

Distributed in the United States by IDG Books Worldwide, Inc.

Distributed by Macmillan Canada for Canada; by Transworld Publishers Limited in the United Kingdom; by IDG Norge Books for Norway; by IDG Sweden Books for Sweden; by Woodslane Pty. Ltd. for Australia; by Woodslane (NZ) Ltd. for New Zealand; by Addison Wesley Longman Singapore Pte Ltd. for Singapore, Malaysia, Thailand, Indonesia and Korea; by Norma Comunicaciones S.A. for Colombia; by Intersoft for South Africa; by International Thomson Publishing for Germany, Austria and Switzerland; by Toppan Company Ltd. for Japan; by Distribuidora Cuspide for Argentina; by Livraria Cultura for Brazil; by Ediciencia S.A. for Ecuador; by Ediciones ZETA S.C.R. Ltda. for Peru; by WS Computer Publishing Corporation, Inc., for the Philippines; by Unalis Corporation for Taiwan; by Contemporanea de Ediciones for Venezuela; by Computer Book & Magazine Store for Puerto Rico; by Express Computer Distributors for the Caribbean and West Indies. Authorized Sales Agent: Anthony Rudkin Associates for the Middle East and North Africa.

For general information on IDG Books Worldwide's books in the U.S., please call our Consumer Customer Service department at 800-762-2974. For reseller information, including discounts and premium sales, please call our Reseller Customer Service department at 800-434-3422.

For information on where to purchase IDG Books Worldwide's books outside the U.S., please contact our International Sales department at 650-655-3200 or fax 650-655-3297.

For information on foreign language translations, please contact our Foreign & Subsidiary Rights department at 650-655-3021 or fax 650-655-3281.

For sales inquiries and special prices for bulk quantities, please contact our Sales department at 650-655-3200 or write to the address above.

For information on using IDG Books Worldwide's books in the classroom or for ordering examination copies, please contact our Educational Sales department at 800-434-2086 or fax 317-596-5499.

For press review copies, author interviews, or other publicity information, please contact our Public Relations department at 650-655-3000 or fax 650-655-3299.

For authorization to photocopy items for corporate, personal, or educational use, please contact Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, or fax 978-750-4470.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: AUTHOR AND PUBLISHER HAVE USED THEIR BEST EFFORTS IN PREPARING THIS BOOK. IDG BOOKS WORLDWIDE, INC., AND AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS BOOK AND SPECIFICALLY DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS CONTAINED IN THIS PARAGRAPH. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES REPRESENTATIVES OR WRITTEN SALES MATERIALS. THE ACCURACY AND COMPLETENESS OF THE INFORMATION PROVIDED HEREIN AND THE OPINIONS STATED HEREIN ARE NOT GUARANTEED OR WARRANTED TO PRODUCE ANY PARTICULAR RESULTS, AND THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY INDIVIDUAL. NEITHER IDG BOOKS WORLDWIDE, INC., NOR AUTHOR SHALL BE LIABLE FOR ANY LOSS OF PROFIT OR ANY OTHER COMMERCIAL DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES.

Trademarks: All brand names and product names used in this book are trade names, service marks, trademarks, or registered trademarks of their respective owners. IDG Books Worldwide is not associated with any product or vendor mentioned in this book.



is a trademark under exclusive
license to IDG Books Worldwide, Inc.,
from International Data Group, Inc.

To help you convert your existing sound files into this very specific AU format, the CD-ROM packaged with this book contains a special utility for just this purpose. Macintosh users can use the SoundApp program and Windows users can use the GoldWave utility. For details on where these files are located, refer to Appendix C.



Although the GoldWave conversion utility (for Windows users) includes a number of sound-editing features such as Smooth and Fade effects, the SoundApp program (for Macintosh users) is only capable of converting files — it can't edit them. If you're a Macintosh user and find that the sounds you convert contain excessive hissing, consider investing in a commercial-quality tool capable of both editing sounds and saving them in the AU format supported by Java. But before you run out and plunk down your hard earned shekels, check the stockpiles of Macintosh shareware that abound on the Web.

Cutting the silence

To reduce the size of sound files as much as possible when converting them for use with Java, keep only the absolutely essential portions of the sound file. Cut out any preceding or trailing silence. In doing so, you reduce the size of the file without adversely affecting the sound.



Because cutting out all preceding and trailing silence in a sound tends to result in playback that begins and ends abruptly, you may be tempted to keep a second or two of silence on either end just to make the sound more natural. Luckily, you can achieve the same effect by applying a *fade-in* to the beginning of the sound and a *fade-out* to the end. These effects give smooth transitions to a sound that may otherwise start and stop abruptly. Not only is the result a more professional and appealing sound, but you also trim precious seconds of download time in the process.

A few seconds may not seem like much, but every single second counts when it comes to bandwidth. This is especially true if you happen to use several sounds in a Web page. Seconds add up to minutes . . . which, if you're paying for every hour of time spent online, add up to dollars.

Creating sound loops

Because sound is such an effective way to grab attention and add impact to a Web page, and because Java applets make using sound so easy, many folks tend to overuse sounds on their Web pages. Unfortunately, doing so creates bandwidth bottlenecks that can turn your Web page viewers off.



Rather than playing a large number of audio clips with your Java applets, consider whether *looping* may be a reasonable alternative. When you loop a sound file, it repeats continuously until you tell it to stop. The effect can be

- 
- ✓ **GraphicConverter (Macintosh):** GraphicConverter (Lemke Software) is a powerful shareware graphics viewing and conversion program. You can also make retouches, perform batch conversions for Mac and PC graphics formats, and more.
 - ✓ **GoldWave (Windows):** GoldWave is a comprehensive digital audio editor that allows you to play, record, edit, and convert audio files on your Windows computer. In addition to the number of audio file formats GoldWave supports, it allows you to save sound files in a special *AU* format that is required by Java applets. To save files in this format, simply choose File→Export from GoldWave's menu, choose Sun (.au) from the Save Files as Type list box that appears, and then click OK. For more details on using sound in your Web pages, see Chapter 5.
 - ✓ **InstallAnywhere:** Written completely in Java, InstallAnywhere Now! from Zero G Software is an ideal lightweight distribution system for your very own Java applications. With this installation tool, you can distribute Java software to Windows, UNIX, OS/2, Mac OS, or any other Java-enabled platform.
 - ✓ **InstallShield (Windows):** InstallShield Java Edition lets you create installations for your Java applications on multiple platforms and ensures a consistent look and feel. Develop and deliver in Java with InstallShield Java Edition — create a single cross-platform installation that covers your Java deployment needs.
 - ✓ **The Java Development Kit (Windows Version 1.1.6 Mac OS Version 1.0.2):** The Java Development Kit (or JDK for short) from Sun Microsystems provides you with the basics you need to create Java applets. Included with the installer for the JDK is an installer for the HTML-based documentation for the software. Note to Mac OS users: Your Mac may require additional software to run Java applets and programs outside of a Web browser. One option is the Macintosh Runtime for Java (MRJ) software, available from Apple Computer's Java Web site at www.apple.com/java.
- Note:** The JDK is © 1997 by Sun Microsystems, Inc., 2550 Garcia Ave., Mtn. View, CA, 94043-1100, USA. All rights reserved.
- ✓ **LivingLinks Editor (Windows):** The LivingLinks Editor (Jeff Orkin) is a Windows application that allows you to visually configure the LivingLinks applet featured in this book. Instead of manually writing HTML code to imbed LivingLinks into your Web pages, why not use your mouse? You can, thanks to the LivingLinks Editor.
 - ✓ **Paint Shop Pro (Windows):** Paint Shop Pro (JASC, Inc) is a graphics program that offers many useful features such as image retouching, painting, and image-format conversion. In addition to enabling you to create and save images in the two graphics formats supported by Java applets, GIF and JPEG, Paint Shop Pro supports transparent and interlaced GIF images (see Chapter 5 for details on the image formats supported by Java).

By breaking the seal on this disk pack, you accept the terms of the IDG Books Worldwide License Agreement included in this book.



Osborne

SOUND BLASTER

The Official Book

SECOND EDITION

Peter M. Ridge, David M. Golden,
Ivan Luk, and Scott E. Sindorf

**THE
OFFICIAL**
CREATIVE
CREATIVE LABS, INC.

**Sound
BLASTER
BOOK**

Covers the Entire Sound
Blaster Family Including
Sound Blaster,
Sound Blaster Pro,
Sound Blaster 16,
Sound Blaster 16 MCD,
Sound Blaster 16 SCSI-2,
& the Sound Blaster
Multimedia Upgrade Kits

*Includes One 3.5-Inch Disk Packed with
Information and Utilities to Bring Out
the Best in Your Sound Blaster, Including*

- *MOD Files — Amazing Digital Music from
the Commodore Amiga World*
- *Cool Sound Blaster Utilities, Including Dual
Module Player and a Demo Version of Creative
VoiceAssist Speech Recognition for Windows,
and the GoldWave Digital Audio Editor*
- *Source Code Examples in C, Pascal, and Quick
Basic for Programming the Sound Blaster*

**INCLUDES
3.5" DISK**



Osborne McGraw-Hill
2600 Tenth Street
Berkeley, California 94710
U.S.A.

For information on software, translations, or book distributors outside of the U.S.A., please write to Osborne McGraw-Hill at the above address.

Sound Blaster: The Official Book, Second Edition

Copyright © 1994 by McGraw-Hill, Inc. All rights reserved. Printed in the United States of America. Except as permitted under the Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher, with the exception that the program listings may be entered, stored, and executed in a computer system, but they may not be reproduced for publication.

1234567890 DOC 9987654

ISBN 0-07-882000-6

Information has been obtained by Osborne McGraw-Hill from sources believed to be reliable. However, because of the possibility of human or mechanical error by our sources, Osborne McGraw-Hill, or others, Osborne McGraw-Hill does not guarantee the accuracy, adequacy, or completeness of any information and is not responsible for any errors or omissions or the results obtained from use of such information.

Series Design: Seventeenth Street Studios

your work when you say "Please close the door and help me update the task list...."

1. Say "Go to sleep" to deactivate VoiceAssist. VoiceAssist will now show "Go to sleep" as the last command. The volume meter in the Recognition button will continue to register and you'll see "Sleeping..." as the last command every time you speak. However no action will be taken. You might notice, especially while word processing on a slower machine, that your other programs respond more quickly. This is because VoiceAssist drains only a minimal amount of your computer's computational power while it's sleeping. While sleeping, VoiceAssist has the luxury of checking incoming sounds against just one voice template—"Wake up"—a much less taxing job than checking incoming sounds against up to 991 other commands that are potentially operative at any one time.
2. Say "Wake up" to activate VoiceAssist. Once you see "Wake up," VoiceAssist will be attentive to your other commands.



NOTE: If VoiceAssist refuses to respond to wake up, you need to first turn it on by clicking the Recognition button.

Quitting VoiceAssist

Click the menu button and select Exit.



NOTE: If you're running the demonstration version of VoiceAssist, you've probably already witnessed the irritating pester screen that tells you that "This demo version only allows you to save 2 applications." Fortunately, you'll see this only when you're training VoiceAssist.

GOLDWAVE



GoldWave turns any PC running Microsoft Windows into a digital audio workstation (see Figure G-6). GoldWave is packed with great features, such as

- Multiple windows, each containing a digital waveform
- Full 16-bit stereo editing

your work when you say "Please close the door and help me update the task list...."

1. Say "Go to sleep" to deactivate VoiceAssist. VoiceAssist will now show "Go to sleep" as the last command. The volume meter in the Recognition button will continue to register and you'll see "Sleeping..." as the last command every time you speak. However no action will be taken. You might notice, especially while word processing on a slower machine, that your other programs respond more quickly. This is because VoiceAssist drains only a minimal amount of your computer's computational power while it's sleeping. While sleeping, VoiceAssist has the luxury of checking incoming sounds against just one voice template—"Wake up"—a much less taxing job than checking incoming sounds against up to 991 other commands that are potentially operative at any one time.
2. Say "Wake up" to activate VoiceAssist. Once you see "Wake up," VoiceAssist will be attentive to your other commands.



NOTE: If VoiceAssist refuses to respond to wake up, you need to first turn it on by clicking the Recognition button.

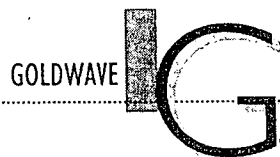


Quitting VoiceAssist

Click the menu button and select Exit.



NOTE: If you're running the demonstration version of VoiceAssist, you've probably already witnessed the irritating pester screen that tells you that "This demo version only allows you to save 2 applications." Fortunately, you'll see this only when you're training VoiceAssist.



GoldWave turns any PC running Microsoft Windows into a digital audio workstation (see Figure G-6). GoldWave is packed with great features, such as

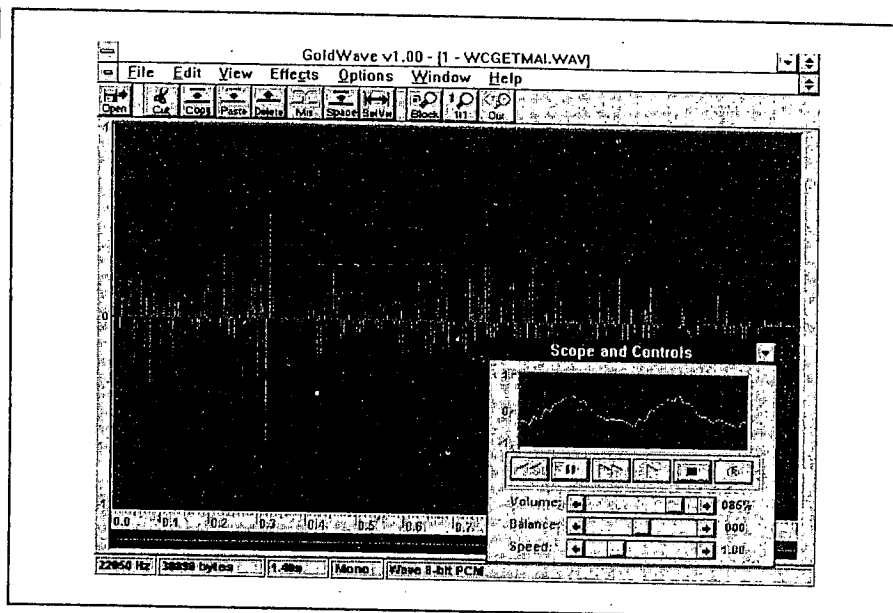
- Multiple windows, each containing a digital waveform
- Full 16-bit stereo editing

- Individual left and right channel editing (for the stereo SB Pro and SB16 only)
- A zoom to magnify digital sample detail for precise editing
- A Detachable "Scope and Control" window that consolidates the most important controls like play, record, and volume
- Powerful effects such as echo, pan, volume, and reversal
- The ability to automatically convert sampling rates, bit sample size, and channels when copying and pasting
- Built-in support for a wide range of digital audio file types including WAV, VOC, IFF, AU, and SND, as well as raw digital audio
- An Expression evaluator for real-time creation of sounds

The last three features most clearly distinguish GoldWave from the Creative WaveStudio that's bundled with the SB16, SB Pro Deluxe, and SB Deluxe. Only GoldWave has these features. If you need to mix and match different types of sound file formats, GoldWave is the ideal product for you. Its main deficiency, from the perspective of a Sound Blaster owner, is that it doesn't yet support the 16-bit VOC file format.

FIGURE G-6

GoldWave
playing a wave
file



Learning GoldWave

GoldWave is accompanied by an extensive user manual that's provided as a Windows Write document. Look for the file GOLDWAVE.WRI in your \SBBOOK\GOLDWAVE directory. To read GOLDWAVE.WRI, navigate to this file with File Manager and double-click on GOLDWAVE.WRI to run the Windows Write application and open GOLDWAVE.WRI in a single step. You can then print this manual in the usual fashion for documents in Microsoft Windows.

The GoldWave manual is a professional-caliber effort, complete with a table of contents, troubleshooting tips, samples, and a lot of interesting technical explanations. For additional help, you can access GoldWave's extensive set of online help screens.



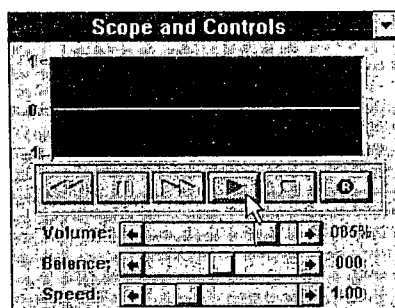
TIP: For an introduction to the chief features of a digital audio editor, read "Creative WaveStudio" in Chapter 5.

The GoldWave Screens

To give you a feeling for GoldWave the main screens are shown here. In Figure G-6 you see a waveform that's been loaded into GoldWave (this is a digital audio file provided with WinCIM, the Windows version of the CompuServe Information Manager, that tells you whether there's any mail in your mail box when you dial into CompuServe). This wave file is currently playing, and you can see in the oscilloscope of the Scope and Controls window the part of the waveform that is currently playing. The Scope and Controls window is shown in an expanded view in Figure G-7.

FIGURE G-7

Scope and
Controls Window



The most important controls are readily accessible. The row of buttons feature the familiar international symbols for play (the button pointed to by the mouse cursor), pause, stop, record, and so forth. The horizontal sliders make it easy to adjust the playback speed, volume, and balance.

In Figure G-8 you see that the Scope and Controls window has been minimized to provide a better view of the waveform. Although only one waveform window is shown, and it has been maximized to fill the screen, you can have many windows open at the same, each with their own waveform. In Figure G-8 you can also see the Effects menu, which provides access to special effects such as echo, fade out, waveform inversion, playback rate change, addition of silence, and waveform amplitude (volume) change.

The last Effects menu item shown in Figure G-8 leads to a feature of GoldWave that's certain to fascinate the technophiles: custom waveforms. Select Expression evaluator to open the Expression Evaluator dialog box, which resembles a calculator loaded with special function buttons, as shown in Figure G-9.

By creating mathematical expressions, you can manipulate an existing sound file as it plays or generate novel ones in real time. The GoldWave user manual provides examples of how to create a square wave, saw tooth (triangular) wave, an exponential decay, a pure tone, and other waveforms.

FIGURE G-8

GoldWave
special effects
menu pulled
down

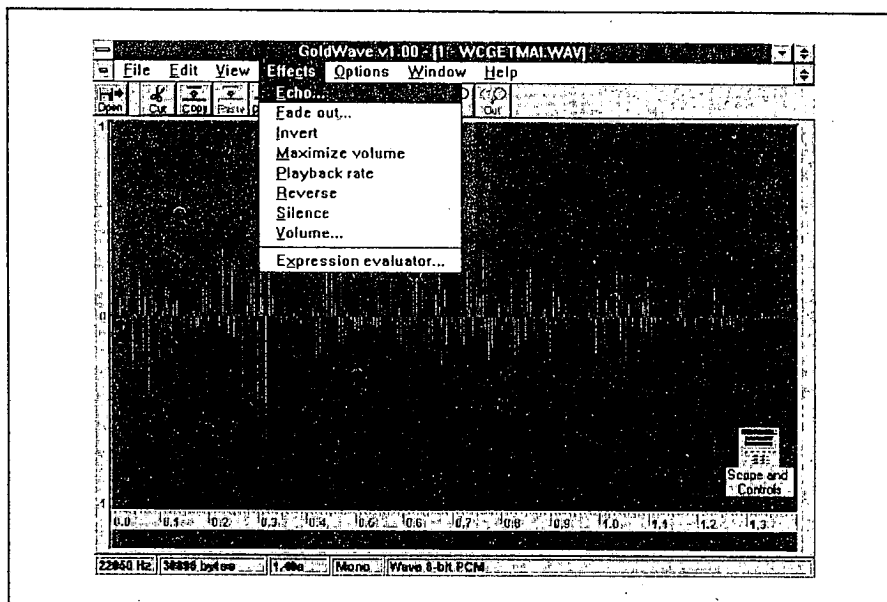


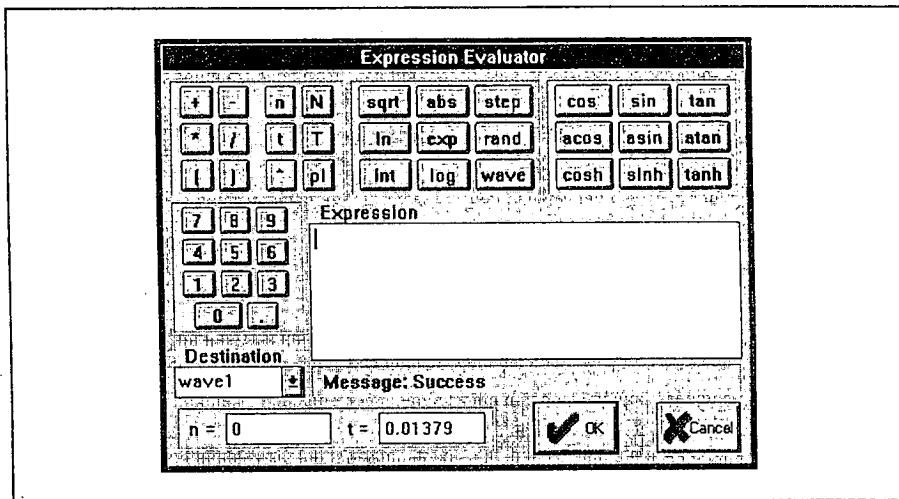
FIGURE G-9

GoldWave

Expression

Evaluator dialog

box



THE SOFTWARE PUBLISHERS

Listed in this section are the addresses and phone numbers of the publishers whose products are described in this appendix. Some of the software on this disk is shareware, which means that the publishers ask you to provide a small monetary contribution if you like the product or if you'd like to receive a version that is richer in features. If you've found that a software program has become part of your computer routine, please register the software program. Two of the programs are "cardware"—the authors would be pleased to receive just a postcard.



TIP: Check the README files in the directories for registration information on these products. Also check the back of the book for money-saving coupons on products from these publishers.

Otto Chrons (Dual Module Player)
 Pyydyspolku 5
 SF-36200 Kangasala
 FINLAND
 Internet: c142902@cc.tut.fi

This is cardware. If you like DMP please send Otto a postcard.

Psychic Psoftware (Dual Module Player Companion)

Brad Meier

8 Jasmay Place

Nahoon Valley

East London

5241

South Africa

Internet: cslm@alpha.ru.ac.za

This is cardware, so, if you enjoy DMPC, the author requests a postcard (or a letter with a picture) of your hometown.

Chris Crain (GoldWave)

P.O. Box 51

St. John's, NF

CANADA A1C 5H5

Internet: chris3@garfield.cs.mun.ca

Standard registration fee is \$30 to remove registration messages and unlock future versions.

Deluxe registration fee is \$59 to receive the next version, when available, and to receive the password for unlocking future versions.

7th C
16-B
16-b
386
486-
4869
3812
> pr
Ω-la

A
A-la
Acce
Acci
Acce
Acce
Acce
Acce
Acce
Acti
Acti
t
i
Ada
Ada

Exhibit "A-6"

Internet site for Wave Systems Corp.

EXHIBIT NO. A-6
EXAM OF CHRISTOPHER CROSBY
DATE Nov 17/06
REPORTER SCW
ASAP Reporting Services, Inc.



Solutions

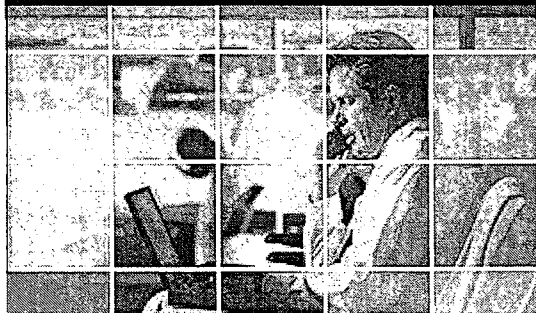
Products

Alliances

About Us

Support

News & Events



trusted computing

The industry standard to add strong security to Computing Platforms, supported by more than 130 industry leaders and tens of millions of PC's deployed by the industry worldwide.

To learn more on how Wave's Trusted Computing solutions can help your business, call (877) 228-WAVE or go to our [How.To.Buy](#) page.

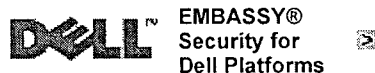
powerful PC security from experts in trusted computing

Wave Systems solves the most critical security problems for enterprises and government with software solutions that are trustworthy, reliable, easy to use, and offer a speedy return on investment. Wave's trusted computing software solutions include strong authentication, data protection, advanced password management and enterprise-wide trust management services.

Getting Started

- ☒ What is Trusted Computing?
- ☒ Identify & Activate a Trusted Platform
- ☒ What is a Trusted Platform Module?
- ☒ More on the Trusted Computing Group

OEM Spotlight



Product Spotlight

Now Available

EMBASSY® Trust Suite 5.3

- ☒ Secure Business Solutions for TPM-Enabled PCs



Recent News and Developments

November 09, 2006

Wave Q3 Revenues Rise over 150% to \$846,000

November 06, 2006

Wave to Demonstrate Enterprise Data Security Solutions at Cartes Show in Paris, Nov. 7-9

November 02, 2006

Wave to Host Q3 Conference Call/Webcast Thursday, November 9th at 4:30 P.M. EDT

October 31, 2006

Trusted Computing and Banking



The FDIC Has Recently Released Findings on New Safeguards for Internet Banking


- ☒ Wave Media Advisory
- ☒ Wave Executive Backgrounder
- ☒ Wave White Paper
- ☒ FDIC News Release
- ☒ FDIC Report

Trusted Computing Solutions for

- ☒ Advanced Data Protection
- ☒ Multifactor Authentication
- ☒ Password Management
- ☒ Identity Protection
- ☒ Secure VPN Access
- ☒ Multimedia Distribution
- ☒ Secure Email
- ☒ Secure Digital Signature
- ☒ Trusted Platform Management and Recovery

Exhibit "A-7"
Internet site for Waves Audio Ltd.

EXHIBIT NO. A-7
EXAM OF CHRISTOPHER CRAIG
DATE NOV. 17/06
REPORTED SA
ASAP Reporting Services Inc.

		<input type="text" value="Search"/>		<input type="button" value="Online Store"/>	<input type="button" value="User Accounts"/>	<input type="button" value="Select Language"/>	<input type="button" value="Waves Sites"/>
PRODUCTS	NEWS	USERS	SUPPORT	HOW TO BUY	DOWNLOAD	EDUCATION	EVENTS
Dealers Online Store Contact Us							

WAVES SPECIALS

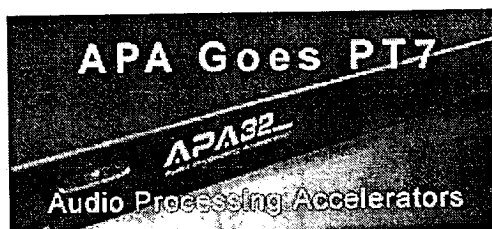
WAVES NEWS

APA Goes PT7



Watch Waves In-Depth Videos [GTR](#) | [Waves Tune](#) | [MaxxBCL](#) |

READ NOW: **OPENMIX™** BOOKS



All Waves bundles now require iLok authorization



[Homepage](#) | [Products](#) | [News](#) | [Users](#) | [Support](#) | [How To Buy](#) | [Download](#) | [Education](#) | [Events](#) | [About](#)
[SSL](#) | [APA](#) | [GTR](#) | [Diamond](#) | [Transform](#) | [Renaissance Maxx](#) | [360° Surround Tools](#) | [Gold](#) | [Platinum](#) | [Masters](#)
[Vocal](#) | [Musicians II](#) | [Musicians](#) | [Restoration](#) | [Broadcast&Production](#) | [Native Power Pack](#)
[Z-Noise](#) | [Tune](#) | [Q-Clone](#) | [L3](#) | [IR-1 V2](#) | [IR-360](#) | [IR-L](#) | [SoundShifter](#) | [Doubler](#) | [Morphoder](#) | [TransX](#)
[Contact Us](#) | [Publications](#)

maxx.com | maxxbass.com | wavescaraudio.com | acoustics.net | sound.org
maxxplayer.com | miniwoofer.com | y96k.com | maxxstream.com

Copyright © 2004 Waves Audio Ltd. All rights reserved.

Exhibit "A-8"
Internet site for A-Wave Studios of San Antonio, Texas

EXHIBIT NO. A-8
EXAM OF CHRISTOPHER CRAIG
DATE Nov. 17/06
REPORTER S. J. F.
ASAP Reporting Services Inc.



Try it for FREE

Go to Napster.com <>

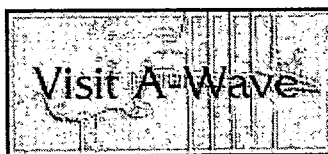
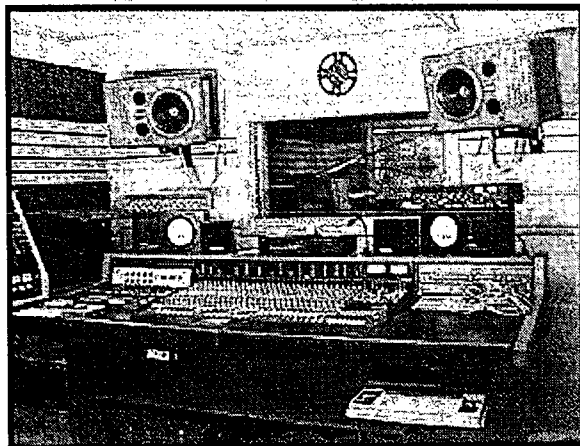
real SUPERPASS news sports
PREMIUM ACCESS entertainment



A-Wave Studios

looking for- → Click here

MUSIC POSTERS



A-Wave Studios
San Antonio, Texas
210-573-2095

LIVE 365.COM

VIP PREFERRED MEMBERSHIP

Extended Size

Take Advantage Of Today's Low Mortgage Rates

Compare Direct Quotes From Our Network Of Lenders

CompareLenders.com

GEAR TREE



Y! MUSIC
musicmatch



Listen to 900,000 tracks On Demand

Try it FREE >> Click Here!

Exhibit "A-9"

Internet site for WebAim, a non-profit organization
within the Centre for Persons with Disabilities
at Utah State University

EXHIBIT NO. A-9

EXAM OF CHRISTOPHER CRAIG

DATE Nov. 17/06

REPORTER S.H.

ASAP Reporting Services Inc.

WAVE 3.0 Accessibility Tool



Methods of using the WAVE:

- [Method 1: Submit the URI of a page](#)
- [Method 2: Upload a page](#)
- [Method 3: Install WAVE toolbar in browser](#)
- [Method 4: Add WAVE bookmarklet to browser](#)

WAVE 3.5 (development version)

See some of the upcoming features and ideas in WAVE 3.5. Feedback is welcome.

Sponsored by:



Temple University
Institute on Disabilities

Powered by:



WebAIM (Web
Accessibility in Mind)

In Memory of:

Len Kasday, whose ideas first brought this project to light.

Info & Feedback

- [Explanation of WAVE icons](#)
- [About the WAVE](#)
- [Copyright and sponsor credits](#)
- [Terms of use](#)
- [Give feedback](#)
- [Request downloadable version & source code](#)
- [Privacy Policy](#)

Method 1. Submit Web Address

Enter the URI here (e.g. www.webaim.org):

[Terms of use](#)

Current WAVE Preferences:

1. **Standard to use:**
 - ✓ WAVE complete (includes WCAG 1.0, Section 508)
2. **Document mode:**
 - ✓ Standard (show all original images, tables, etc.)
3. **WAVE features to include:**
 - ✓ ALL

Method 2. Upload a page (graphics will not be loaded)

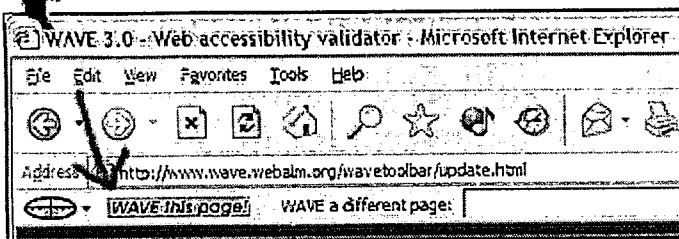
Enter local file location:

[Terms of use](#)

Method 3. Install WAVE Toolbar in browser

When you install the WAVE toolbar in your browser, all you have to do is go to the Web page that you want to evaluate, then click on "WAVE this page!" or type in the Web address of the page you want to view, using the "WAVE a different page" field.

- [Install Netscape toolbar](#)
- [Install Internet Explorer toolbar](#)
- [Install Mozilla toolbar](#)



Method 4. Add WAVE bookmarklet to browser

When you add the WAVE "bookmarklet" to your browser, all you have to do is go to the Web page that you want to evaluate, then click on the bookmarklet to process it through the WAVE.

Install the WAVE bookmarklet.

Exhibit "A-10"

Internet site for Wikipedia, owned by Wikipedia Foundation, Inc.

EXHIBIT NO.. A-10
EXAM OF CHRISTOPHER CRAIG
DATE NOV. 17/06
REPORT SAH
ADDED TO RECORD ON 11/17/06

Wave

From Wikipedia, the free encyclopedia

*This article is about **waves** in the most general scientific sense; a separate article focuses on ocean waves. For other meanings see wave (disambiguation).*



It has been suggested that this article be split into articles entitled *wave*, accessible from a disambiguation page. (Discuss)

A **wave** is a disturbance that propagates through space or spacetime, often transferring energy. While a mechanical wave exists in a medium (which on deformation is capable of producing elastic restoring forces), waves of electromagnetic radiation (and probably gravitational radiation) can travel through vacuum, that is, without a medium. Waves travel and transfer energy from one point to another, with little or no permanent displacement of the particles of the medium (there is little or no associated mass transport); instead there are oscillations around fixed positions.

For many years, scientists have been trying to work out the problem of energy transfer from one place to another - especially sound and light energy.

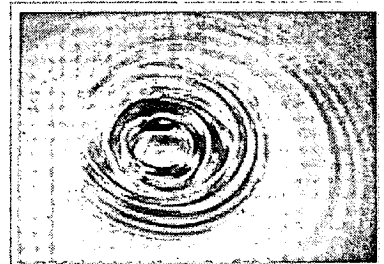
Contents

- 1 Characteristics
 - 1.1 Polarization
 - 1.2 Examples
- 2 Mathematical description
 - 2.1 The wave equation
 - 2.2 Travelling waves
 - 2.3 Propagation through strings
- 3 Transmission medium
- 4 See also
- 5 Further reading
- 6 External links

Characteristics

Periodic waves are characterized by *crests* (highs) and *troughs* (lows), and may usually be categorized as either longitudinal or transverse. Transverse waves are those with vibrations perpendicular to the direction of the propagation of the wave; examples include waves on a string and electromagnetic waves. Longitudinal waves are those with vibrations parallel to the direction of the propagation of the wave; examples include most sound waves.

When an object bobs up and down on a ripple in a pond, it experiences an orbital trajectory because ripples are not simple transverse sinusoidal waves.



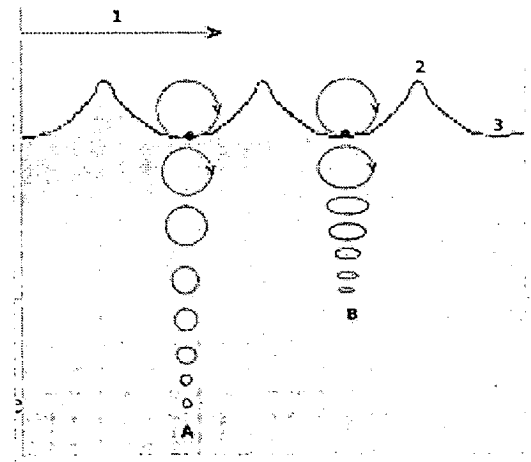
Surface waves in water

Ripples on the surface of a pond are actually a combination of transverse and

longitudinal waves; therefore, the points on the surface follow orbital paths.

All waves have common behaviour under a number of standard situations. All waves can experience the following:

- Reflection – the change of direction of waves, due to hitting a reflective surface.
- Refraction – the change of direction of waves due to them entering a new medium.
- Diffraction – the circular spreading of waves that happens when the distance between two points is equal distance.
- Interference – the superposition of two waves that come into contact with each other.
- Dispersion – the splitting up of waves by frequency.
- Rectilinear propagation – the movement of waves in straight lines.



Polarization

A wave is polarized if it can only oscillate in one direction. The polarization of a transverse wave describes the direction of oscillation, in the plane perpendicular to the direction of travel. Longitudinal waves such as sound waves do not exhibit polarization, because for these waves the direction of oscillation is along the direction of travel. A wave can be polarized by using a polarizing filter.

Examples

Examples of waves include:

- Ocean surface waves, which are perturbations that propagate through water.
- Radio waves, microwaves, infrared rays, visible light, ultraviolet rays, x-rays, and gamma rays make up electromagnetic radiation. In this case, propagation is possible without a medium, through vacuum. These electromagnetic waves travel at 299,792,458 m/s in a vacuum.
- Sound - a mechanical wave that propagates through air, liquid or solids.
- Seismic waves in earthquakes, of which there are three types, called S, P, and L.
- Gravitational waves, which are fluctuations in the gravitational field predicted by general Relativity. These waves are nonlinear, and have yet to be observed empirically.

Mathematical description

Waves can be described mathematically using a series of parameters.

The **amplitude** of a wave (commonly notated as A , or another letter) is a measure of the maximum disturbance in the medium during one wave cycle. In the illustration to the right, this is the maximum vertical distance between the baseline and the wave. The units of the amplitude depend on the type of wave — waves on a string have an amplitude expressed as a distance (meters), sound waves as pressure (pascals) and electromagnetic waves as the amplitude of the electric field (volts/meter). The amplitude may be constant (in which case the wave is a *c.w.* or *continuous wave*), or may vary with time and/or position. The form of the variation of amplitude is called the *envelope* of the wave.

The **wavelength** (denoted as λ) is the distance between two sequential crests (or troughs). This generally has the unit of metres; it is also commonly measured in nanometres for the optical part of the electromagnetic spectrum.

A **wavenumber** k can be associated with the wavelength by the relation

$$k = \frac{2\pi}{\lambda}.$$

The **period** T is the time for one complete cycle for an oscillation of a wave. The **frequency** f (also frequently denoted as ν) is how many periods per unit time (for example one second) and is measured in hertz. These are related by:

$$f = \frac{1}{T}.$$

In other words, the frequency and period of a wave are reciprocals of each other.

The *angular frequency* ω represents the frequency in terms of radians per second. It is related to the frequency by:

$$\omega = 2\pi f = \frac{2\pi}{T}.$$

There are two velocities that are associated with waves. The first is the **phase velocity**, which gives the rate at which the wave propagates, is given by

$$v_p = \frac{\omega}{k}.$$

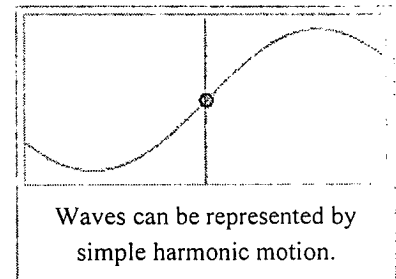
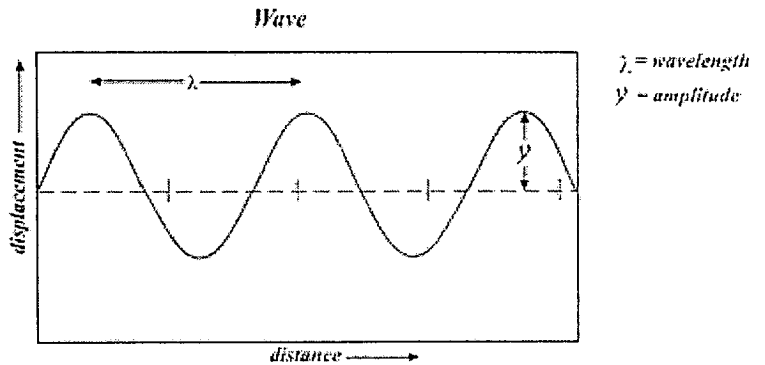
The second is the **group velocity**, which gives the velocity at which variations in the shape of the wave's amplitude propagate through space. This is the rate at which information can be transmitted by the wave. It is given by

$$v_g = \frac{\partial \omega}{\partial k}$$

The wave equation

The **wave equation** is a differential equation that describes the evolution of a harmonic wave over time. The equation has slightly different forms depending on how the wave is transmitted, and the medium it is traveling through. Considering a one-dimensional wave that is travelling down a rope along the x -axis with velocity v and amplitude u (which generally depends on both x and t), the wave equation is

$$\frac{1}{v^2} \frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}.$$



In three dimensions, this becomes

$$\frac{1}{v^2} \frac{\partial^2 u}{\partial t^2} = \nabla^2 u,$$

where ∇^2 is the Laplacian.

The velocity v will depend on both the type of wave and the medium through which it is being transmitted.

A general solution for the wave equation in one dimension was given by d'Alembert. It is

$$u(x, t) = F(x - vt) + G(x + vt).$$

This can be viewed as two pulses travelling down the rope in opposite directions; F in the $+x$ direction, and G in the $-x$ direction. If we substitute for x above, replacing it with directions x, y, z , we then can describe a wave propagating in three dimensions.

The Schrödinger equation describes the wave-like behaviour of particles in quantum mechanics. Solutions of this equation are wave functions which can be used to describe the probability density of a particle. Quantum mechanics also describes particle properties that other waves, such as light and sound, have on the atomic scale and below.

Travelling waves

Waves that remain in one place are called *standing waves* - e.g. vibrations on a violin string. Waves that are moving are called *travelling waves*, and have a disturbance that varies both with time t and distance z . This can be expressed mathematically as:

$$u = A(z, t) \cos(\omega t - kz + \phi)$$

where $A(z, t)$ is the amplitude envelope of the wave, k is the *wave number* and ϕ is the *phase*. The phase velocity v_p of this wave is given by:

$$v_p = \frac{\omega}{k} = \lambda f,$$

where λ is the *wavelength* of the wave.

Propagation through strings

The speed of a wave travelling along a string (v) is directly proportional to the square root of the tension (T) over the linear density (μ):

$$v = \sqrt{\frac{T}{\mu}}.$$

Transmission medium

The medium that carries a wave is called a *transmission medium*. It can be classified into one or more of the following categories:

- A *linear medium* if the amplitudes of different waves at any particular point in the medium can be added.
- A *bounded medium* if it is finite in extent, otherwise an *unbounded medium*.
- A *uniform medium* if its physical properties are unchanged at different locations in space.
- An *isotropic medium* if its physical properties are the *same* in different directions.

See also

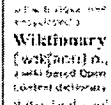
- Transmission medium
- List of wave topics
- Capillary waves
- Doppler effect
- Group velocity
- Phase velocity
- Ripple tank
- Standing wave
- Audience wave
- Ocean surface wave

Further reading

- French, A.P. (1971). *Vibrations and Waves (M.I.T. Introductory physics series)*. Nelson Thornes. ISBN 074874479.

External links

- Science Aid: Wave properties
(<http://www.scienceaid.co.uk/physics/waves/properties.html>) Concise guide aimed at teens
- Vibrations and Waves
(http://www.lightandmatter.com/html_books/3vw/ch03/ch03.html) - an online textbook
- A Radically Modern Approach to Introductory Physics (<http://kestrel.nmt.edu/~raymond/classes/ph13xbook/node1.html>) - an online physics textbook that starts with waves rather than mechanics
- Sounds Amazing (<http://www.acoustics.salford.ac.uk/feschools/>) - AS and A-Level learning resource for sound and waves

	Look up <i>Wave</i> in Wiktionary, the free dictionary.
---	--

Retrieved from "<http://en.wikipedia.org/wiki/Wave>"

Categories: Articles to be split | Partial differential equations | Waves

- This page was last modified 17:10, 10 November 2006.
 - All text is available under the terms of the GNU Free Documentation License.
(See **Copyrights** for details.)
- Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc.

Exhibit "A-11"

Internet site for 94.7 The Wave, owned by CBS Radio Inc.

EXHIBIT NO. A-11

EXAM OF CHRISTOPHER CRAIG

DATE 000.17/06

REPORTER SA

ASAP Reporting Services, Inc.

The WAVE's 40 HAWAII BONUS TRIPS!

Listen Weekdays at 5pm!

[Click here for more details!](#)



What was that song?
[Click here!](#)

[WAVE MUSIC](#) | [TRIP-A-DAY](#) | [ON-THE-AIR](#) | [WAVE CONTESTS](#) | [WAVE EVENTS](#) | [YOUR COMMUNITY NEWS](#) | [ABOUT THE WAVE](#)

Listen To The WAVE Live Online!



Please disable any pop-up blockers you have set on your computer.
[Click here for the FAQ page](#)

TRIP A DAY

[ENTER NOW](#)

[VIEW TRIP DETAILS](#)

Win a Trip A Day
anywhere in
the world!

FRIDAY'S
WINNING NAME
ANNOUNCEMENT
TIMES ARE
12pm & 5pm!

WIN A TRIP ANYWHERE
IN THE WORLD FROM
THE WAVE!

The WAVE is giving away a
Trip-A-Day every weekday!!!
Go ANYWHERE IN THE

WORLD, you choose the destination! Click
here for all the details!



Brian McKnight On The WAVE!

Filling in for Dave Koz all this week from
6-9am with Pat Prescott!



The WAVE's Winter Jazz Series

The WAVE is proud to present two amazing shows as part
of our Winter Jazz Series: A Peter White Christmas on
November 25th and A New Years Eve Gala with Euge
Groove!

Buy your tickets now!



The Smooth Jazz Sunday Brunch

ADVERTISEMENT

The WAVE's 40 HAWAII BONUS TRIPS!

[Click here to find out how you can win!](#)

ON AIR NOW

Talaya Trigueros
Weekdays
9:00 am - 2:00 pm



76°F

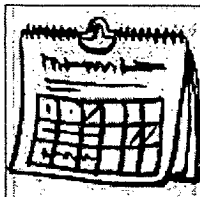
90001 Go

Presented by Good Neighbor Pharmacy, has become a Southern California tradition. Every Sunday we broadcast live from THREE locations: Spaghettini Grill & Jazz Club in Seal Beach, i. Cugini in Santa Monica and now Salt Creek Grill in Valencia!

Visit The WAVE



The WAVE on MySpace.com



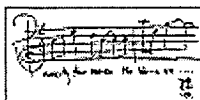
The WAVE Event Calendar

Looking for some Smooth Jazz events to add to your social calendar? Then check out our new and improved WAVE Event Calendar!



The WAVE's Photo Gallery

Check out The WAVE's Photo Gallery, including pictures of Guest DJ's, Trip a Day winners, WaveFest and more!



Download the Famous WAVE Melody!

Download the WAVE's famous WAVE melody to your computer!

It's everything you need to know about car buying.

AutoScoop

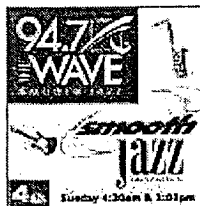
Autoscoop

Learn everything you need to know about buying a car!



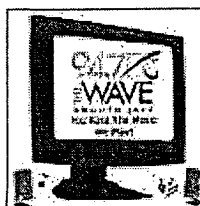
The Saving Zone

Find out about great ways to save money by checking out The Saving Zone!



Smooth Jazz TV

Be sure to check out Smooth Jazz TV Sundays at 4:30am and 3:00pm on NBC4! Each week features different Smooth Jazz artists!



Join The Wave's Listener Advisory Board

Help us pick the music we play on The WAVE by joining the listener advisor board!

Detailed Forecast



WAVE Original Videos:

Saxophonist Boney James



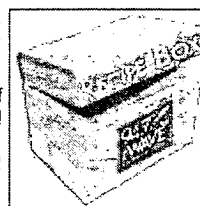
Holiday Concert in the Park featuring saxophonist Michael Lington

On Sunday, December 10th at Disneyland® Park Enter to win your exclusive invitation!

The WAVE's Recipe Box

The WAVE's On-Air Personalities share with you some of their favorite seasonal recipes!

New!! Favorite Family Recipes!!



View Corinne Bailey Rae's Video

From her song "Put Your Records On"



Avery Easy Peel Mailing Label Contest

Tell us why you deserve to win!

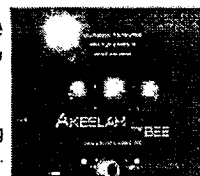


Download The WAVE Wallpaper to your Desktop!

Add a little paradise to your computer with The WAVE's wallpaper!

Pat's Pages: "Akeelah and the Bee"

Watch Pat Prescott's interview with writer/director Doug Atchison of the movie "Akeelah and the Bee".



Sponsored Links

Los Angeles Refinance Rates Fall

Compare free quotes from 4 lenders. Lower your monthly payments. Bad credit OK. No obligation. We make banks compete for your business! Refinance with a trusted and reputable lender.
www.QuotesCompete.com

Loreto Bay Vacation Homes

New homes in luxurious locations. A world away that's easy to reach.
LoretoBay.com

Free Official Warren Sapp Raiders Jersey

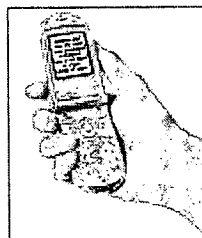
Complete sponsor offers and receive this authentic Sapp jersey free!
www.sports-offer.com

Capital One Credit Cards

Competitive rates. No hassle rewards. Apply now.
www.capitalone.com

Capital One High Yield Money Market

4.8% APY - Earn more with a high yield money market account.
www.capitalone.com/directbanking



Remind Me To Listen!

Let The WAVE remind you when to listen for each day's Trip A Day announcement time!



Enter Our Store

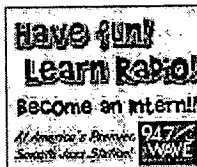
Click above to enter our store!
 Open 24 hours!



Download The WAVE Logo for your AOL Instant Messenger Buddy Icon!

The WAVE is Commercial Free!

Nine at Nine. Nine songs in a row. Commercial Free!



The WAVE is looking for interns!

The WAVE's promotions department is recruiting interns!

MMVI CBS Radio, All Rights Reserved.
 Powered by Radiomat and Intertech Media, LLC
[Home](#) | [Contact Us](#) | [Terms of Use](#) | [EEO Report](#)
 Privacy Policy / Your California Privacy Rights TM & 2006 CBS Radio Inc. and its relevant subsidiaries. CBS RADIO & EYE Logo TM & 2006 CBS Broadcasting Inc.
 Used under license.

Exhibit "A-12"

Internet site for The Wave Media,
owned by The Wave Media, Inc.

EXHIBIT NO. A-12

EXAM OF CHRISTOPHER CRAIG

DATE NOV 17/06

REPORTER SA

ASAP Reporting Services Inc.



HOME

Jump To: [The Wave Media Corporate](#) [The Wave Magazine](#) [Web Services](#)
[The Wave Media Home](#) [About Us](#) [Jobs](#) [Press Releases](#) [Media Kit & Sales Collateral](#) [Advertise](#) [Contact Us](#)

Welcome to The Wave Media

The Wave Media, Inc. was founded in 1999. We publish *The Wave Magazine* and its online equivalent, www.thewavemag.com.

Latest Press Releases:

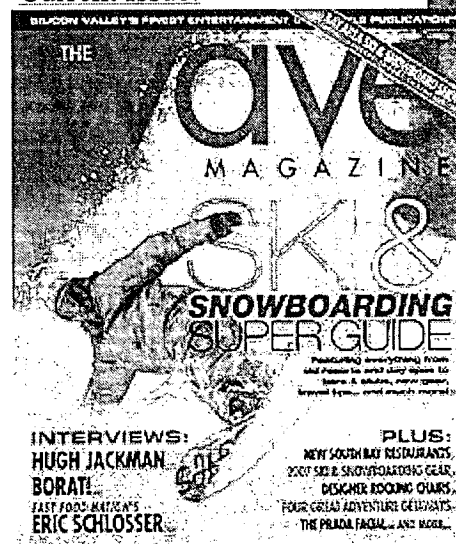
San Jose, CA, January 20, 2005 -*The Wave Magazine* Begins Selected Home Delivery With Silicon Valley Community Newspapers

San Mateo, CA, July 28, 2004- *The Wave Magazine* Targets Silicon Valley.

San Mateo, CA, March 10, 2004- *The Wave Magazine* Increases Distribution Boxes by 200%.

San Mateo, CA, March 9, 2004- *The Wave Magazine* unveils new redesign.

Current Issue:



Vol 06, Issue 22
November 1- 14, 2006

[Home](#) [About Us](#) [Jobs](#) [Press Releases](#) [Media Kit & Sales Collateral](#) [Advertise](#) [Contact](#)

Copyright © 2003 TheWaveMedia.com

Exhibit "A-13"

Internet site for Goldwave Incorporated

EXHIBIT NO. A-13

EXAM OF CHRISTOPHER CRAG

DATE Nov. 17/06

REPORTER

S. J.

ASAP Reporting Services Inc.



GoldWave Inc.

GoldWave Incorporated

- ▶ Home
- ▶ Contact
- ▶ Support
- ▶ Forums
- ▶ About
- ▶ GoldWave.com
- ▶ GoldWave.ca

GoldWave Digital Audio Editor

- ▶ Download
- ▶ Details
- ▶ Plug-ins
- ▶ Purchase
- ▶ Developers

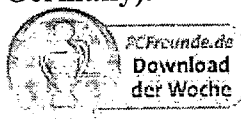
MULTIQUENCE

Multitrack Audio /
Video Mixer

- ▶ Download
- ▶ Details
- ▶ Purchase

News

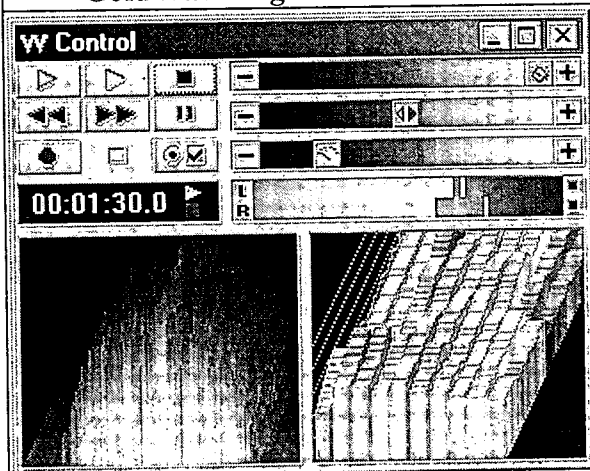
- 2006/11/01 **GoldWave v5.16 released!**
- 2006/11/01 **Save nearly 10%!**
Due to the high Canadian dollar, GoldWave licenses have been reduced by \$5 to CAD\$50 (US\$45) for a limited time.
- 2006/09/30 **GoldWave used for historic recording analysis.**
See the Houston Chronicle and the BBC web sites for details.
- 2006/08/03 **GoldWave receives Download of the Week Award (Week 31, PCFreunde, Germany).**



- 2005/09/29 **MULTIQUENCE v2.54 available.**
- 2005/06/15 **GWVoice Plug-in available.**

Products

GoldWave Digital Audio Editor

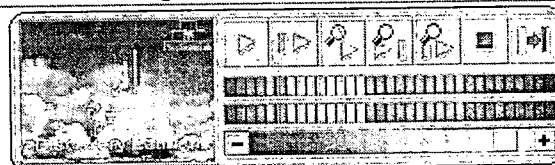


[Try](#) [Buy](#)

GoldWave is a top rated, professional digital audio editor. It contains so many great features, you will be amazed by all the things it can do:

- Play, edit, mix, and analyze audio
- Record audio from cassettes, vinyl records, radio, etc. through your computer's line-in
- Record dictation through a microphone or play dictation back at a slower speed for transcription (with foot pedal control)
- Record and edit audio for podcasting

MULTIQUENCE Multitrack Mixer



[Try](#) [Buy](#)

MULTIQUENCE is a remarkably flexible multitrack digital audio and video mixing program. Use it to:

- Mix together any number of files into a single stereo file
- Create presentations with background music and/or video
- Edit home videos and add text captions and compositing effects
- Record and edit songs with separate instrument and vocal tracks
- Combine multiple layers of video into one AVI, QuickTime Movie, or Windows Media Video file
- Capture video from a video recorder, built-in TV tuner, or other video source.
- [More...](#)

The fast and intuitive interface performs all

- Apply special effects, such as fade, equalizer, doppler, mechanize, echo, reverse, flanger, and more
- Digitally remaster and restore old recordings with noise reduction and pop/click filters
- Make perfect digital copies of audio CD tracks using the CD Reader tool and save them in **wav**, **wma**, **mp3**, or **ogg** files
- Edit music for dance programs, figure skating, gymnastics
- Analyze human speech, bird song, whale song
- Demonstrate digital signal processing with filter effects and the Expression Evaluator tool
- View a variety of real-time visuals and level meters
- Convert files to/from different formats, such as **wav**, **wma**, **mp3**, **ogg**, **aiff**, **au**, **vox** and even raw binary data
- Expand functionality with plug-ins
- More...

GoldWave is the most advanced and complete audio editor available in its price range. It includes all of the common audio editing commands and effects, plus powerful built-in tools such as a batch processor/converter, a CD reader, and audio restoration filters that cost extra in other similar programs. Comprehensive, easy to use, and efficiently engineered, GoldWave offers the best value in audio editing software. With over 10 years of development and widespread usage, it has an excellent and unmatched track record.

Try the **fully functional** evaluation version (v5.16, 2006/11/01) of GoldWave.



(about US\$45)

editing instantly, which means you can drag-and-drop, trim, copy, paste, and split files with almost no processing time. Many real-time effects can be applied to each file. It supports **wav**, **mp3**, **aiff**, **ogg** and **wma** digital audio files as well as **avi**, **mov**, **wmv**, and **mpg** video files.

MULTIQUENCE's non-destructive virtual editing system eliminates time consuming processing, especially when working with large files. Audio and video are played directly from the original files.

Try the evaluation version (v2.54, 2005/09/29) of MULTIQUENCE.

Compare with GoldWave Audio Editor.



(about US\$55)

Keywords: sound editor, MP3 editor, WMA editor, WAV editor, sound converter, sound recorder, copy CD ripper, cassette, tape recording software, vinyl recording software, LP recording software, album, wav to mp3, vorbis, acoustic, WMV editor, QuickTime editor, movie editor, music editor, vocals, music software, podcast editor, podcasting software, sound software, analysis, ringtones

Exhibit "A-14"

Internet site for C|NET Downloads.com,
owned by C|NET Networks, Inc.

EXHIBIT NO. A-14

EXAM OF CHRISTOPHER CRAIG

DATE Nov. 17/06

REPORTER SAF

ASAP Reporting Services Inc.

**DOWNLOAD.com**
SAFE, TRUSTED, AND SPYWARE-FREESearch:

W

[Today on CNET](#) [Reviews](#) [News](#) [Downloads](#) [Tips & Tricks](#) [CNET TV](#) [Compare Prices](#)[Software](#) | [Music](#) | [PC Games](#)[advertisement](#)**Audio & Video
Software**[Audio Production](#)[CD & DVD Burners](#)[DVD Tools](#)[Home Entertainment](#)[Jukeboxes](#)[MP3 Search Tools](#)[Media Players](#)[Movie Trailers](#)[Music Management](#)[Rippers & Encoders](#)[Streaming Audio](#)[Utilities & Plug-Ins](#)[Video](#)**GoldWave 5.16****Download Now**[Add to my Watch List](#) (What's this?)[Send this to a friend](#)**Editor's rating**

Not rated

Average user rating (112 votes) [Rate it!](#)**Downloads**

978,935 Popular

Publisher

GoldWave

Date added

November 2, 2006 New!

License

Free to try; \$4

Limitations

Some features

Requirements

Windows 98/M

File size

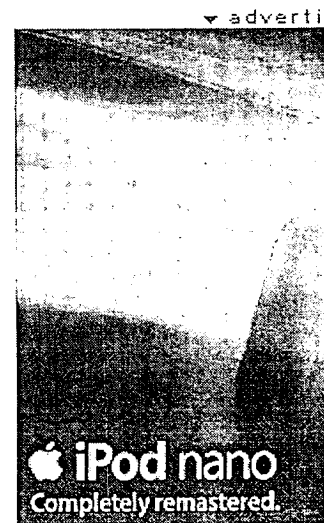
2.26MB

[Alternate download links...](#)[PUBLISHER'S DESCRIPTION](#)[USER REVIEWS](#)[ADDITIONAL COMMENTS](#)**PUBLISHER:****GoldWave****PUBLISHER INFORMATION:****GoldWave**

GoldWave is a professional digital audio editor. It is one of the most popular and highest rated audio editors for Windows. Use it to play, edit, mix, restore, and analyze audio, or apply special effects, such as fade, equalizer, doppler, mechanize, echo, reverse, time warp, noise reduction, pop/click filtering, and more. It is perfect for voice-over or dictation work, editing music for dance programs, creating podcasts, restoring audio from old vinyl records, or just having fun. New files can be recorded from a cassette deck, turntable, radio, microphone, etc. or digitally copied from an audio CD. Real-time visuals are displayed during playback and recording. See audio in ways you've never seen it before. GoldWave supports MP3, OGG, WAV, WMA, and many more audio formats and performs batch conversions and processing.

Version 5.16 added track information and preview to CD Reader. Added Previous marker command. Added partial dual core processor support. Added new keyboard shortcuts.

CNET Networks is not responsible for the content of this Publisher's Description. We encourage you to determine whether this product or your intended use is legal. We do not encourage or condone the use of any software in violation of applicable laws.

Find the perfect

gadget

Who doesn't want an MP3 player, a big TV, or a shiny new laptop this winter? CNET's editors have picked the best tech you can get this year--more than 200 gift ideas for every budget and desire.

» Find tech gifts

▼ advertisement



To link to this page, copy the following code to your site:

```
<a href="http://www.download.com/3000-20-100010"
```

AVERAGE USER RATING:**Read user reviews...****Download Now****Publisher's Description:**

CNET Download.com does not sell, resell, or license any of the products listed on the site. We cannot be held liable download or use of these products.

DOWNLOAD.COM XML FEEDS

Get RSS updates on Audio & Video Software downloads

New Software | **Top Rated** | **Most Popular** | **Add to Newsburn**

[Help Center](#) | [Submit Software](#) | [Free MP3s](#) | [Spyware Removal](#) | [All Software](#) | [All RSS feeds](#)

Search:



CNET.com [Today on CNET](#) | [Reviews](#) | [News](#) | [Compare prices](#) | [Tips & Tricks](#) | [Downloads](#) | [CNET TV](#)

[About CNET Networks](#) | [Jobs](#) | [Advertise](#) | [Partnerships](#) | [Site map](#)

[Visit other CNET Network:](#)

Copyright ©2006 CNET Networks, Inc. All rights reserved. [Privacy policy](#) | [Terms of use](#)

Exhibit "A-15"

Internet site for Simtel.Net, owned by Digital River, Inc.

EXHIBIT NO. A-15

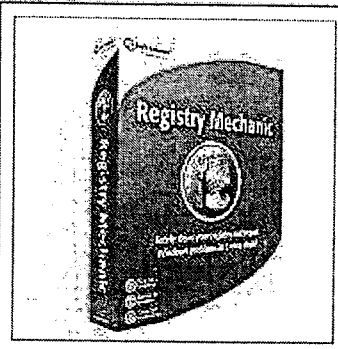
EXAM OF CHRISTOPHER CRAIG

DATE NOV. 17/06

REPORTER

SAH

ASAP Reporting Services Inc.



Registry Mechanic 5.2

With Registry Mechanic you can safely clean, repair and optimize the Windows registry with a few simple mouse clicks! Problems with the Windows registry are a common cause of Windows crashes, slow performance and error messages.

SEARCH:

[DOWNLOAD NOW](#)

Shop at **CANADIAN TIRE** with
your **FREE \$300 Gift Card**

[See Site for Details](#)

GET IT NOW



ACCOUNT

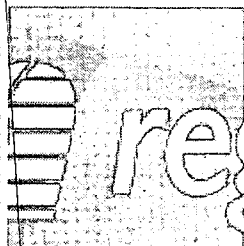
[log on/register](#)
[view basket](#)
[log off](#)

HOT SPOTS

[new uploads](#)
[top 100 downloads](#)
[newsletter signup](#)
[hot games from gamezone.com](#)

TOP SEARCHES

[Advanced Server](#)
[Data Center](#)
[DeskJet](#)
[Microsoft Access](#)
[HP Photosmart](#)
[Business Inkjet](#)
[Color Laser Printer](#)
[ink jet](#)
[Digital Camera](#)
[Microsoft Office XP](#)
[USB cable](#)
[HP Photosmart](#)
[Virtualization](#)



ADVERTISEMENT

HOME > TOP 100 DOWNLOADS THIS WEEK OF COMPUTER SOFTWARE, GAMES, TOOLS AND UTILITIES AT SIMTEL.NET

most popular

Period: Overall | Today | Yesterday | **This week** | Last week | This month | Last month


Found: 100. Displaying: 1-10

1 2 3 4 5 6 7 8 9 10

Rank	Name	Downloads	Ratings
1.	FLV Player 1.3.3 FLV Player is a standalone application to play Flash .flv files with. This utility can come in handy when viewing many FLV files, as it doesn't require the Flash IDE. File Size: 1.13 MB	30593	53.00%
2.	IrfanView Plugins 3.98 IrfanView Plugins for the fast FREEWARE image viewer/converter. File Size: 4.92 MB	10379	100.00%
3.	Registry Mechanic 5.2 With Registry Mechanic you can safely clean, repair and optimize the Windows registry with a few simple mouse clicks! Problems with the Windows registry are a common cause of Windows crashes, slow performance and error messages. File Size: 2.55 MB	9011	59.00%
4.	Total Commander 6.55a Totalcmd (former Wincmd) is a file manager replacement for Windows. Features: Drag&Drop from and to explorer/desktop. Packer shell for ZIP/ARJ/LHA/RAR/UC2/TAR/GZ/CAB/ACE. Command line, full text search also in packed files, button bar,FTP client. File Size: 1.61 MB	8441	93.00%
5.	VirtualDJ 4.1 rev 2 VirtualDJ is the DJ software used by many big brands such as Numark or Hercules. It features cutting-edge technology such as advanced beatlocking, synchronised sampler, DRM, timecode vinyls, music video scratching, etc... File Size: 18.91 MB	6638	100.00%
6.	EVEREST Ultimate Edition 2006 3.50 EVEREST Ultimate Edition is a system diagnostics and benchmarking solution for PC users, based on the award-winning EVEREST Technology. File Size: 6.78 MB	5045	74.00%
7.	Little Fighter 2 1.9c This is a freeware wide-scrolling action-fighter game. The game can have up to 4 human players on one computer and 8 characters in network play at one time. Gamemodes include VS mode, Stage mode. File Size: 12.70 MB	4527	57.00%
8.	Sygate Personal Firewall 5.6	4011	87.00%

It's **2:00AM**
and you're
about to be

for the
11th time
tonight



**TURN TO PRIMA EGUIDES
WE ARE NEVER CLOSED**

- HIDDEN GUNS & ARMO
- COMPLETE BOSS BATTLE SOLUTIONS
- FULL MAPS
- DETAILED STRATEGY
- OVER 350 EGUIDES FOR YOUR FAVORITE GAMES

**P
PRIMA
GAMES**

FREE for personal use, Sygate Personal Firewall 5.x provides the best security in a user friendly interface, protecting your PC from hackers, trojans and more. For multiple licenses or advanced users, Sygate Personal Firewall Pro is recommended.
File Size: 8.80 MB

9. GoldWave 5.16

3051 85.00%

A professional digital audio player, editor, converter, recorder, and analyzer. It includes many effects, such as equalizers, noise reduction, and time warp. Displays real-time visuals. Supports MP3, OGG, WAV, WMA and many more formats.
File Size: 2.26 MB

10. EVEREST Corporate Edition 3.50

2858 N/A

EVEREST Corporate Edition is an automated network audit, system change tracking and network monitoring solution for small and large corporate enterprises, based on the award-winning EVEREST Technology.
File Size: 7.69 MB

1 2 3 4 5 6 7 8 9 10

Found: 100. Displaying: 1-10

LEGENDS



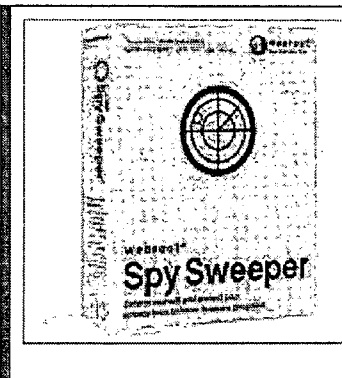
ADD TO
YOUR BASKET

PUTS THIS PRODUCT INTO
YOUR FILE BASKET FOR
LATER CD-ROM ORDERING
OR BULK DOWNLOADING



REGULAR
DOWNLOAD

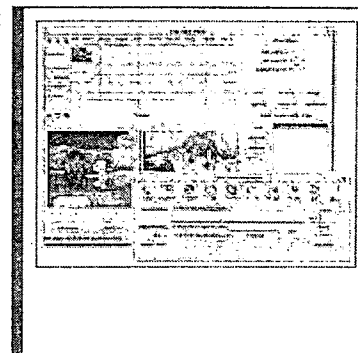
OPENS REGULAR DOWN-
LOAD PAGE AND STARTS
TO DOWNLOAD YOUR
SELECTED APPLICATION



Webroot Spy Sweeper 4.5

Spy Sweeper 4.5 detects and completely removes the nastiest spyware, including those using rootkits to hide. Spy Sweeper is also armed with 16 advanced Smart Shields. Backed by FREE expert customer support. This is a MUST-HAVE. FREE DOWNLOAD.

DOWNLOAD NOW



AVS Video

Convert bet formats, tra portables, a capture, coj and video fi XviD, DV, M Archos), Wl MOV, SWF, MPEG, ASF,

Authors: submit product | my products | my details | request ownership | request merging

Miscellaneous: advertise | recommend us | privacy policy | dmca notice | terms of use | contact us

Simtel is a registered trademark of Digital River, Inc. | Simtel.Net is a service mark of Digital River, Inc.

Exhibit "A-16"

Internet site for Simtel.Net - Product Reviews,
owned by Digital River, Inc.

EXHIBIT NO. A-16

EXAM OF CHRISTOPHER CRAIG

DATE NOV. 17/06

REPORTER SA

ASAP Reporting Services Inc.



Registry Mechanic 5.2
With Registry Mechanic you can safely clean, repair and optimize the Windows registry with a few simple mouse clicks! Problems with the Windows registry are a common cause of Windows crashes, slow performance and error messages.

Download Now

SEARCH: GO!

Shop at **CANADIAN TIRE** with your **FREE \$300** Gift Card
See Site for Details

GET IT NOW



ACCOUNT

log on/register
view basket
log off

HOT SPOTS

new uploads
top 100 downloads
newsletter signup
hot games from
gamezone.com

TOP SEARCHES

Advanced Server
Data Center
DeskJet
Microsoft Access
HP Photosmart
Business Inkjet
Color Laser Printer
ink jet
Digital Camera
Microsoft Office XP
USB cable
HP Photosmart
Virtualization

**FREE
Software
Distribution**

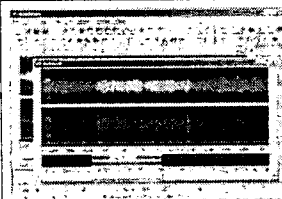
ADVERTISEMENT

It's **2:00AM**
and you're
about to be
WAKED
for the
11th time
tonight

HOME > MULTIMEDIA > SOUND EDITORS, SPECIAL EFFECT UTILITIES > GOLDWAVE 5.16 FREE DOWNLOADS AT
SIMTEL.NET



GoldWave 5.16



Click to view screenshot in original size.



Quick Facts

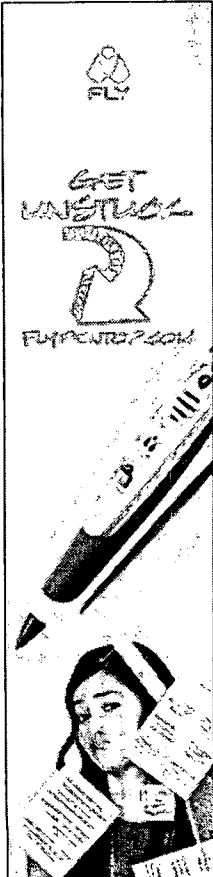
Web site: Visit the **GoldWave** web site
Author: GoldWave Inc.
License type: Shareware (\$45.00)
Categories: Sound Editors, Special Effect Utilities
Downloads: 857934
Average User Rating: 85.00%
Rated by: 5
File Size: 2.26 MB
Release Date: Oct 31, 2006
Supported languages: English
Operating Systems: Windows 95/98/ME/NT/2000/XP
System requirements: No special requirements

ADD **DOWNLOAD NOW**

Your Basket

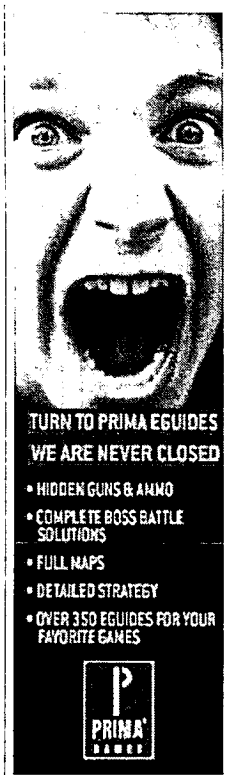
Add To Basket
Put this item in your basket to bulk download or store it for later investigation.

Advertisement



Description by publisher

GoldWave is a professional digital audio editor. It is one of the most popular and highest rated audio editors for Windows. Use it to play, edit, mix, restore, and analyze audio, or apply special effects, such as fade, equalizer, doppler, mechanize, echo, reverse, time warp, noise reduction, pop/click filter. New files can be recorded from cassettes, albums, radio, microphone, etc. or digitally copied from audio CDs. Real-time visuals are displayed during playback and recording. Supports MP3, OGG, WAV, WMA, and many more formats and can perform batch conversions and processing. Excellent value with free upgrades. GoldWave has a proven track record with over 10 years in the audio editing software business.



Services & Actions	Name	Description
	Read User Reviews	Read other users opinion.
	Review Title	Rate and/or write your opinion.
	See more by this author	Search for other products created by this author.



Latest Reviews

Apr 08, 2006 06:07:44 by nripun

I used this product to reduce noise in the audio file. This product did a good job in reducing noise. Currently i am using the trial version v5.10. I will be buying the licensed version soon. I recommend this product to all who are interested in speech/audio processing. One of the few things that i didn't find in v5.10 is the spectrogram. I hope that will be incorporated in the versions to come.

Apr 27, 2005 17:32:16 by an anonymous user

What a fantastic, feature packed program and under 2MB too! If you plan to do any work with audio, you must give this program a try. I've tested many audio programs and this one is by far the best.

	<p>Webroot Spy Sweeper 4.5 Spy Sweeper 4.5 detects and completely removes the nastiest spyware, including those using rootkits to hide. Spy Sweeper is also armed with 16 advanced Smart Shields. Backed by FREE expert customer support. This is a MUST-HAVE. FREE DOWNLOAD.</p> <p>Download Now</p>		<p>AVS Video Tools 5.3 Convert between all key formats, transfer video to portables, apply effects, capture, copy, rip & burn DVD and video files: AVI, DivX, XviD, DV, MP4 (PSP, iPod, Archos), WMV, 3GP, 3G2, MOV, SWF, DVD, VOB, VRO, MPEG, ASF, H.263, H.264, RM</p> <p>Download Now</p>
--	---	--	--

Authors: [submit product](#) | [my products](#) | [my details](#) | [request ownership](#) | [request merging](#)

Miscellaneous: [advertise](#) | [recommend us](#) | [privacy policy](#) | [dmca notice](#) | [terms of use](#) | [contact us](#)

Simtel is a registered trademark of Digital River, Inc. | Simtel.Net is a service mark of Digital River, Inc.

Exhibit "A-17"

Internet site for SharewareRiver.com,
owned by Shareware River, Inc.

EXHIBIT NO. A-17

EXAM OF CHRISTOPHER CRAIG

DATE NOV. 17/06

REPORTER SAI.

ASAP Reporting Services Inc.



Search

Go!

[Help](#) | [Advanced Search](#)

CATEGORIES

- [Business](#)
- [Desktop](#)
- [Games](#)
- [Graphics & Video](#)
- [Home & Education](#)
- [Internet](#)
- [MP3 & Audio](#)
- [Software Developer](#)
- [Utilities](#)
- [Web Authoring](#)

DEVELOPER AREA

- [Login](#)
- [Create Account](#)

FREE NEWSLETTER

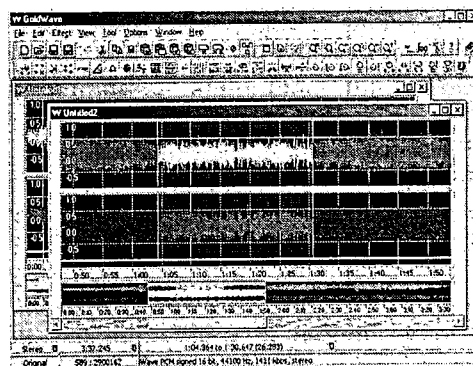
Join our free e-mail newsletter to receive news of the latest releases.

Home / MP3 & Audio / Music Creation

SYNCH YOUR IPOD

GoldWave v5.06

Author: GoldWave
Platform: Windows (all)
Price: \$43
Submitted: 05/07/2004
File Size: 1.63 MB
Downloads: 3558
Rating:

[Download](#)


GoldWave is a professional digital audio editor. Use it to play, edit, mix, restore, and analyze audio, or apply special effects, such as fade, equalizer, doppler, mechanize, echo, reverse, time warp, noise reduction, pop/click filter. New files can be recorded from cassettes, albums, radio, microphone, etc. or digitally copied from audio CDs. Real-time visuals are displayed during playback and recording. Supports MP3, OGG, WAV, WMA, and many more formats and can perform batch conversions and processing. Excellent value with free upgrades. GoldWave has a proven track record with over 10 years in the audio editing software business.

See also:

[DVD TO DVDR](#)
[DVD TO AVI](#)
[Ringtone Converter/Compos...](#)
[MP3 Disc Burner](#)
[Alive MP3 CD Burner](#)
[Ease CD Burner](#)
[CD Sequencer](#)
[CD MP3 Burner](#)
[The Palette - Melody Comp...](#)
[Audio Editor XP](#)
[Acoustic Labs Mixer](#)
[HappyEO Pro - DEMO](#)
[HappyEO - Standard Editio...](#)
[Echoview Pro](#)
[Neural Noise Synthesizer](#)
[Brain Sound Studio](#)
[Ashampoo BurnYa! AudioCD ...](#)
[Zortam Mp3 Media Studio](#)
[Band Minus One](#)
[PercussionStudio](#)

- DVD Copier, DVD Copy, DVD to SVCD, DVD to VCD, DVD R...
- DVD TO AVI Converter, DVD to Mpeg 4, DVD to AVI, DVD ...
- Add new ringtones to your mobile or cellular phone...
- A CD-burning software that can convert MP3 files t...
- Burn your own audio CDs from MP3, WAV or OGG on-t...
- Directly burn WAV, MP3, OGG or WMA files to audio CD...
- Record extra MIDI instruments in the CD tracks of ...
- Burn your favorite songs to CDs so you can listen ...
- The Palette program is a tool for the creation of ...
- Professional digital sound editor, Record and edit ...
- The Acoustic Labs Mixer is a digital audio multitr...
- HappyEO is a virtual instrument with your computer...
- HappyEO is a virtual instrument with your computer...
- A suite of interactive music and audio calculating...
- Generates specially structured noise to stimulate ...
- Subtly alters sound files to alter the brainwaves ...
- The easiest way to burn your own audio CDs!
- ID3 tag editor, Mp3/Kar Organizer, Mp3 Normalizer,...
- The easiest way to create accompaniment for singer...
- Percussion Studio is a tool designed to help music...

Exhibit "A-18"
Internet site for PC Mechanic

EXHIBIT NO. A-18
EXAM OF CHRISTOPHER CRAIG
DATE Nov. 17/06
REPORTER SDH.
ASAP Reporting Services Inc.

GoldWave - Sound Editor

Category: [Software / Games & Software](#) - February 24, 2003. Posted by [Force Flow](#).

User Rating: No votes yet!

Add To: [Digg](#) | [Del.icio.us](#) | [Blinklist](#) | [Furl It](#) | [Spurl](#) | [Simpy](#) | [Shadows](#) | [My Web](#)



Just starting sound editing? Or have you been dabbling in it to for a while? In either case, GoldWave is one of those programs that it is easy for the beginner to learn to use, while still meeting the expectations of the more experienced editor. In addition, it's shareware, so you can use it for free with minor limitations.



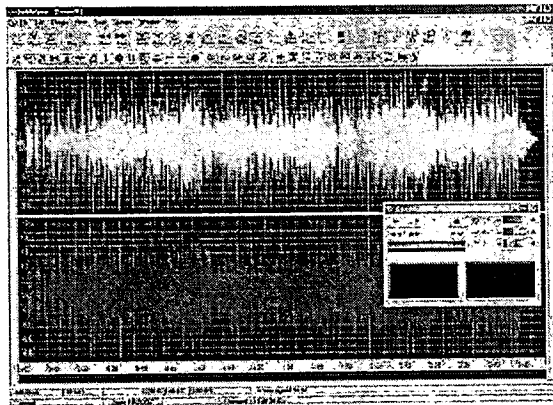
Remove Vocals Easily.

Make your own Karaoke CDs from any song, CD, MP3. Download Instantly!

www.Make-Your-Own-Karaoke.com

User Interface

The best quality of the interface is how all of the sound editing options are easily accessed and discernable. If you want to change the volume, just click on the "Change Volume" button. If you want to change the pitch, just click the "Change Pitch" button. You get the idea. There's just one thing I found frustrating on my first use: how to get all these buttons to show up on the toolbar. After search for a while, I finally found out that if you click "Window", then "Tool Bar", a box will pop up that will allow you to select which buttons you wish to display on the toolbar. A handy little thing to have, but it was hidden pretty well.



The Tools

First off, here's some of the general usage tools that are available:

- CD Extraction
- Echo
- Exchange Stereo Channels (R & L)
- Fade In and Fade Out
- Flange
- Mechanize
- Pitch Change
- Reverse
- Silence
- Time Warp (Speed)
- Volume Change

Here are some of the more advanced tools:

- Band pass Filter
- Doppler Effect
- Equalizer
- Noise Gate
- Noise Reduction
- Pop/Click Remover
- Stereo Pan
- Waveform Offset

Free Music Editor CD

Complete Music & Audio Editing Studio on CD - Free!
www.thinkall.com

WebSource Configurator

Product/Service Configurator with online administration
www.webcominc.com

Summary:

A contribution from one of our forum members

Site Tools:

[Add to Favorites](#)
[My Notes](#)
[Send to Friend](#)
[Comment \(2 posts in 1 threads\)](#)
[Print Version](#)
[Reprint Rights](#)

Rate This Article

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

Page 1 of 3 | [Next »](#)



Copyright 1997-2006 PC Media, Inc. | ALL RIGHTS RESERVED | [Terms Of Use](#) | [Privacy Policy](#) | [Site Map](#) | [RSS](#)

[About Us](#) | [Team](#) | [Licensing](#) | [Write For Us](#) | [Advertising](#) | [Jobs](#) | [Contact Us](#)

Powered by [Miraserver](#)

Design by [N-Vent](#)

Exhibit "A-19"

Internet site for Top Ten Reviews

EXHIBIT NO. A-19

EXAM OF CHRISTOPHER CRAIG

DATE NOV. 17/06

REPORTER S.A.

ASAP Reporting Services Inc.



We Do the Research So You Don't Have To

[Software](#)
[Web Services](#)
[Movies](#)

Audio Editing Software Reviews 2006

Listed in order of rating

- GOLD** [Dexter Audio Editor](#)
- SILVER** [GoldWave Digital Audio Editor](#)
- Bronze** [Blaze Media Pro](#)
- #4 [Acoustica](#)
- #5 [Fx Audio Editor](#)
- #6 [NGWave Audio Editor](#)
- #7 [DC Millennium](#)
- #8 [Audio Editor Pro](#)
- #9 [Easy Audio Editor](#)
- #10 [Audio Editor Gold](#)
- #11 [Acoustic Labs Audio Editor](#)
- #12 [FlexiMusic Wave Editor](#)
- #13 [Audio Editor](#)
- #14 [AudioSoftware Audio Editor](#)



GoldWave Digital Audio Editor

[PRODUCT
DETAILS](#)
[COMPARE
PRODUCTS](#)
[BUY NOW](#)

Overall Rating

Audio Editing

Recording/Burning

Ease of Use:

Help/Support:

Manufacturer: GoldWave Inc.

Version: 5.13

Best Price: \$48.00

\$48.00

Best Pricing:
[Direct from
Manufacturer](#)
[Click to go to Mfg.](#)

ARTICLES

[Audio Editing Software
Definitions](#)

[Home Uses of Audio Editing
Software](#)

[Professional Uses of Audio
Editing Software](#)

A complete list of features and [side-by-side comparisons](#) are available on the [HomePage](#).

GoldWave Digital Audio Editor Reviewer's Comments



Serious audio editors, this product has more audio tools and visual aids than any other product in this price range. Every effect and filter is totally adjustable and you can record anything—with GoldWave, our **"TopTenREVIEWS Silver Award"** winner.

This program can handle huge files, up to 4GB, more with NTFS. It has real-time visuals, previews and processes edits instantly. It is extremely flexible, has an effects plug-in interface, customizable tools bars and you can change the colors on the visuals.

GoldWave is compatible with a wide variety of formats, including several WAV formats, AIFF (Apple compatible), MP4 and WMA (Windows Media). This program does not have its own burning software.

[Ads by Goooooogle](#)

[Advertise on this s](#)

[Free Music Editor CD](#)

Complete Music & Audio Editing Studio on CD - Free!

www.thinkall.com

[Professional Audio Editor](#)

A better way to edit mp3 & audio files - Quick & easy

www.AudioEditorPro.com

[Audio Restoration](#)

Free Report Reveals Insider Secrets Most Never Know About Mastering!

MasteringCentral.com

Audio Editing: [Rating]

GoldWave supports a long list of editing tools and visual aides, such as waveform, spectral view, VU meter, analog meter, X-Y graph, spectrogram and a "blowing inferno."

This software has editing tools to do just about everything—batch processing, information editing, mix

Ads by Google

channel mixing and includes an equalizer, processor, an expression evaluator, format converter, effect editor and signal analysis tools. All edits are processed quickly, with a preview option and it has a handy mouse scroll zoom and right click edits.

This product has over 20 preset effects, including compressor/expander, the ability to reduce vocals, do cross fading and a "time warp."

This is a good product for restoration projects, it includes a noise/silence reduction, pop/plick, smoother FFT filters.

From what we can tell, this program can split files but does not have the ability to split tracks.

Recording/Burning Ability: ☒ ☒ ☒ ☐

GoldWave can record from anything—sound card, streaming audio, CDs, video files and MIDI files. It can record instantly whatever is playing on the sound card, which is nice.

It can work with many popular formats, including RAW, AU, AVI, Dialogic VOX, OGG Vorbis, SND and text d

However, if you want to burn your projects onto a CD or DVD, you will need to install the burning program separately.

Ease of Use: ☒ ☒ ☒ ☐

This program is moderately easy to use. However, for beginning audio editors, the advanced features may be overwhelming. Nevertheless, experienced editors will enjoy the great visuals and adjustable effects and filters.

GoldWave Digital Audio Editor Screenshots. [Click to Enlarge](#)



Help and Support: ☒ ☒ ☒ ☐

GoldWave offers exceptional help through FAQs, help pages, a product manual, tutorials as well as an online user forum and email correspondence for technical support. When we contacted technical support, they answered our questions within hours.

Summary:

GoldWave is perfect for those that want to perform major audio editing and analyzing tasks, it contains excellent restoration tools and can edit large files.

A complete list of features and side-by-side comparisons are available on the [Audio Editing Software HomePage](#).

©2006 TopTenREVIEWS, Inc.

[Advertise on this site](#)

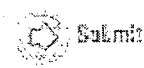


Email will only be sent
notifying you of new
review sites
[Privacy Policy](#)

FIRST NAME:

LAST NAME:

EMAIL:



Sponsored Links

[Want to become a sponsor?](#)

Click on the link to email us about becoming a sponsor.

[Acoustic Labs Audio Editor](#), [Acoustica](#), [Audio Editor](#), [Audio Editor Gold](#), [Audio Editor Pro](#), [AudioSoftware Audio Editor](#), [Media Pro](#), [Dexter Audio Editor](#), [Diamond Cut Millennium](#), [Easy Audio Editor](#), [FlexiMusic Wave Editor](#), [Fx Audio Editor](#), [GoldWave Digital Audio Editor](#), [NGWave Audio Editor](#), have all been reviewed with the latest versions of audio editing software.

A side-by-side [audio editing software comparison](#) is available on the [Homepage](#).

Looking for reviews on other software categories or products? Visit www.toptenreviews.com



[Home](#) [Resources](#) [About Us](#) [Contact us](#) [Advertising](#) [Sitemap](#) [TopTenREVIEWS.com](#)
[Privacy Policy](#)



Copyright ©2006 TopTenREVIEWS, Inc. All Rights Reserved.

Reproduction in whole or in part in any form or medium without express written permission of TopTenREVIEWS, Inc. is p